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THE MAGAZINE FOR INFORMATION EXECUTIVES

SPECIAL ISSUE

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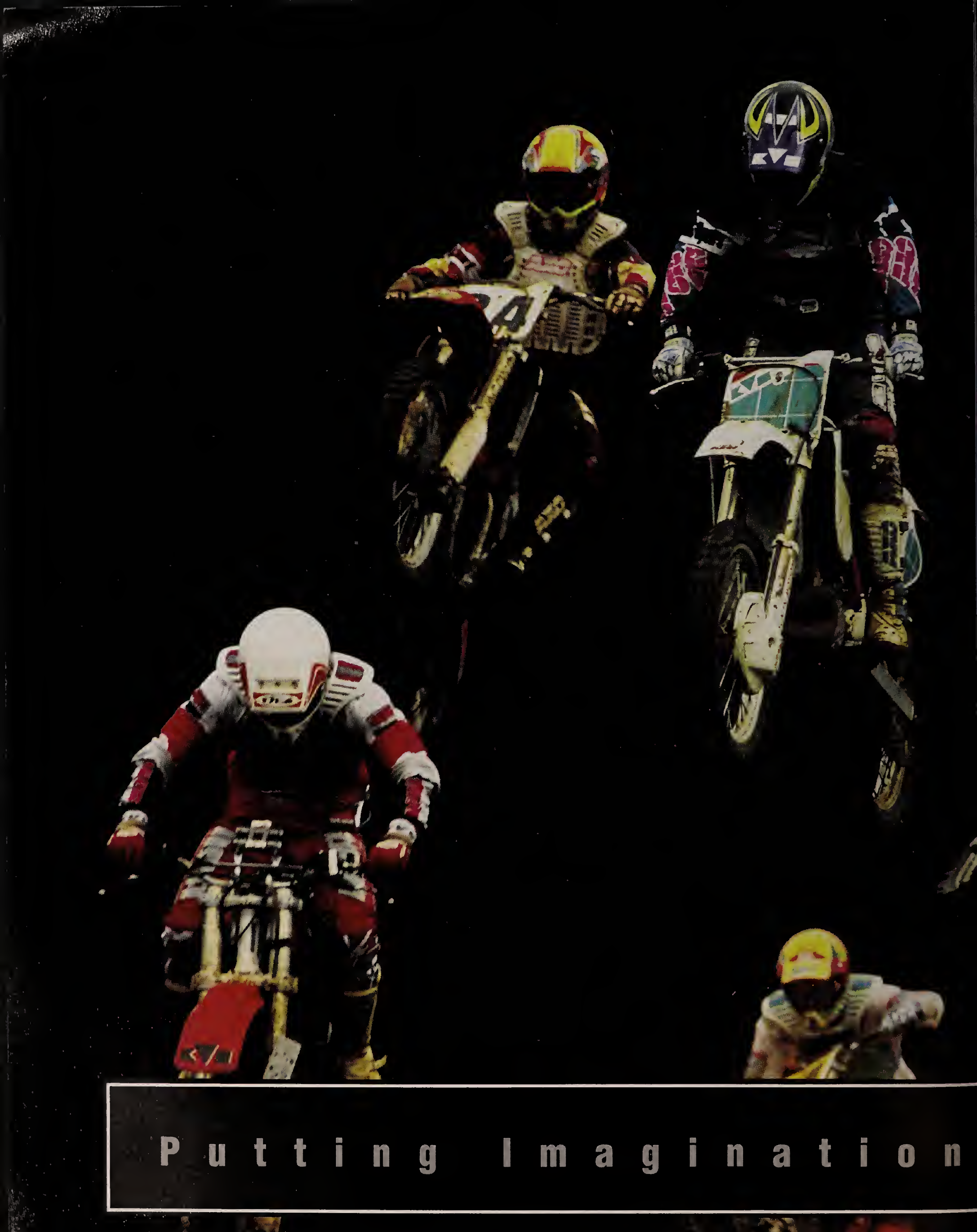

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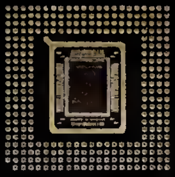

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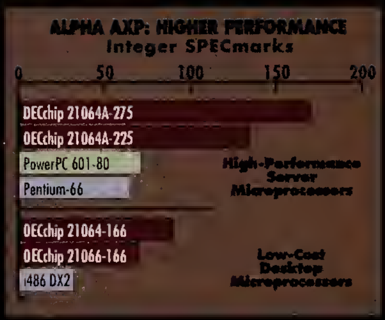

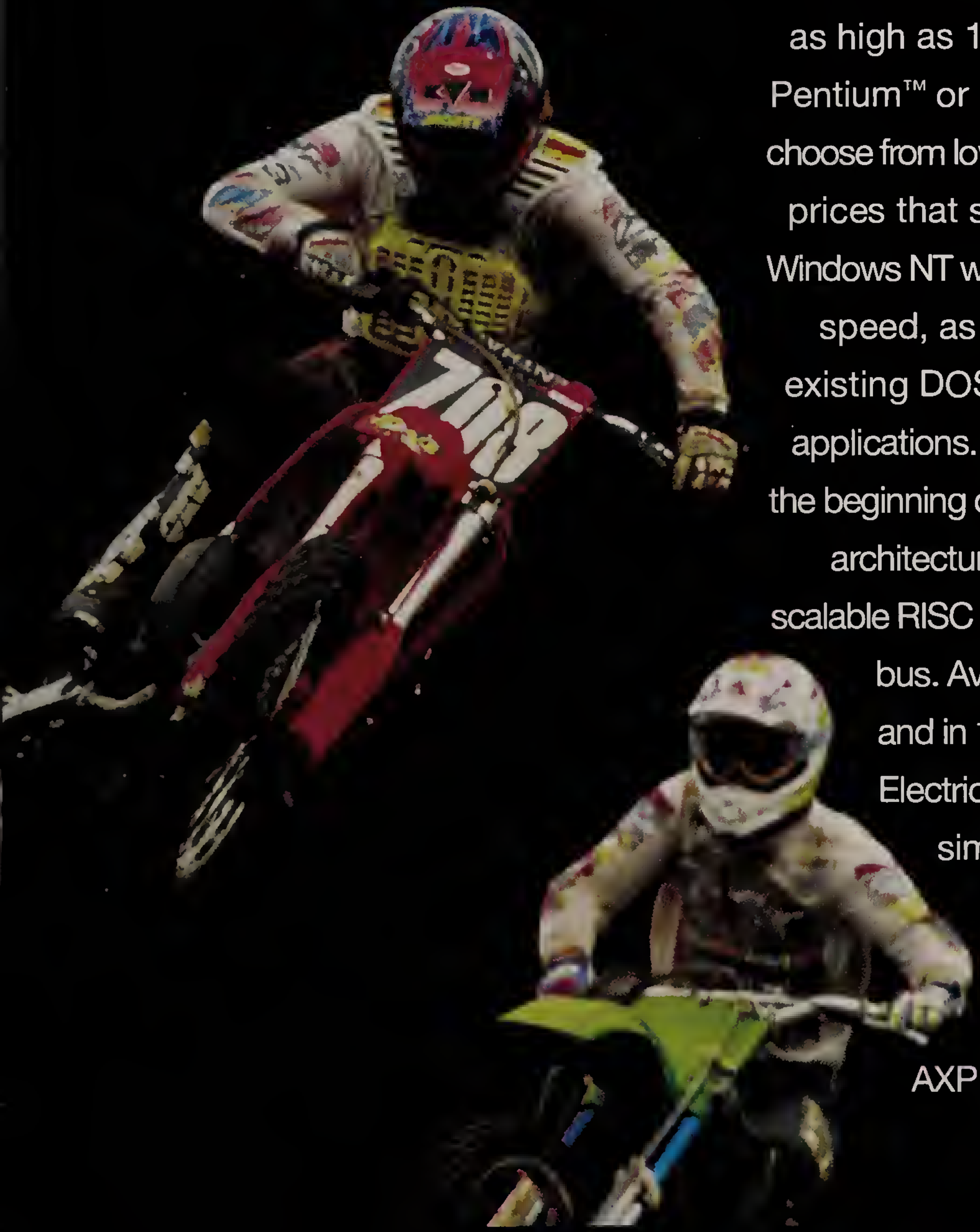

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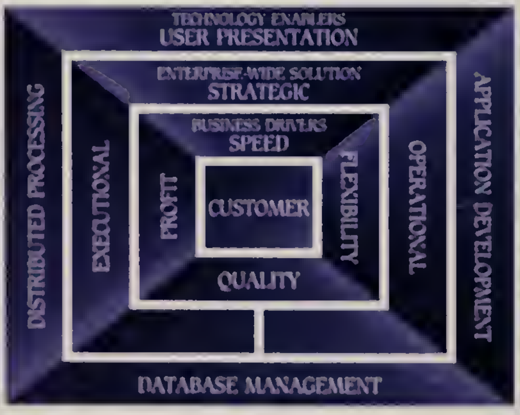

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CIO

VOLUME 7, NUMBER 6

FEATURES

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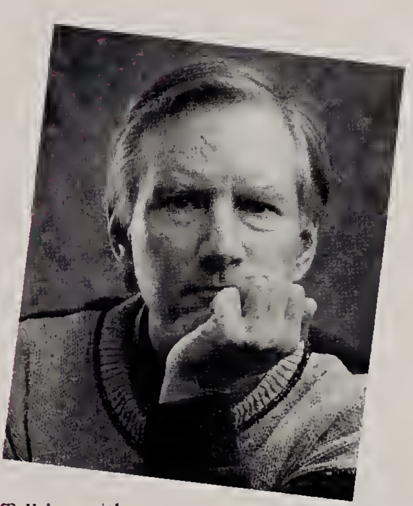
Unconventional Wisdom

Management guru Tom Peters argues that companies looking for the one true path to reorganization are going to end up stuck in place while the nimble, protean world whizzes past. *By Thomas Kiely*



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Five Uneasy Pieces

Great mountains of prose have been heaped up around the ideas of empowerment, total quality management, reengineering, downsizing and outsourcing. Much of that prose has been beguilingly upbeat. But almost every promising strategy can also be a dangerous fad; success requires knowing where the dangers lie. *CIO*'s editors have culled the archives to identify a roster of pitfalls that can put at risk the manifest opportunities of these five leading trends.

SECOND OPINIONS: EVALUATING I.T. 40

A Measured Success

Determining technology's contribution to a company's health and well-being is an important part of the chief executive's job. Old hands at the measurement game agree: Indicators must go beyond cost and relate to the firm's business goals. *By Richard Pastore*

Show the spirit of giving: Pass this issue along to your CEO
Cover photo by Tom Croke

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Crossing the Line

What happens when a line manager takes charge of information systems, or an IS manager assumes a prominent business-unit position? At Mattel and Brooklyn Union Gas, such crossovers initially resulted in culture shock for both the managers and their new staffs. But once these transplants settled in and gained the trust of employees, the cross-pollination of talent made their functions newly rich in business knowledge and technology expertise. *By Thomas Kiely*

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Profiting from the Peace Dividend

In the face of waning defense work, federal research labs are keeping busy beating their lasers into plowshares and helping the cause of U.S. competitiveness. Some private-sector manufacturing companies are taking full advantage, teaming up with the labs to tap scientific expertise on assorted space-age technologies. *By David H. Freedman*

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STATE OF THE ART: WAVES OF THE FUTURE

Though they have yet to prove their mettle, a few newcomers to the technology scene hold considerable promise for business users. *By John Edwards*

EXPORT MANAGEMENT 64

WORKING SMART: MADE FOR EXPORT

When paperwork threatened to overwhelm Raytheon's export staff, it was clear the old manual processing system couldn't survive. Thanks to some export-management software, things are sailing smoothly again. *By Nancy Hitchcock*

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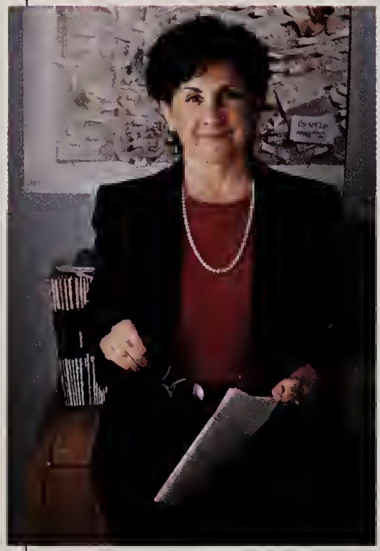

PHOTO BY WEBB CHAPPELL

Information executives are always on the lookout for ways to convey the importance of information technology to executives outside the information systems world. We know our readers pass along selected *CIO* articles to top management and peers. Why not an entire issue? That's the idea behind this special edition of *CIO* magazine, the theme of which is "Power Sharing." We hope you will do just that.

In creating this issue, we focused on topics important to non-IS management. We set the tone with an interview with Tom Peters. A longtime fan of *CIO*, Peters has some surprising views on reengineering.

Executives have been liberally treated to the upside of the IT landscape; the pitfalls of these initiatives are not so freely reported. Our editors provide irreverent snapshots of the downside of many IT buzzwords circulating today—outsourcing and downsizing to name just two.

In his Second Opinions article, Senior Writer Richard Pastore interviews senior non-IS executives on how they measure the value of information technology. Senior Editor Tom Kiely profiles two "switchers," a business executive who moved into a CIO role and an IS executive who moved into a top corporate line position.

With the Clinton administration touting the new competitiveness of government, Contributing Writer David Freedman explores what it takes to make a public/private-sector partnership successful. Rounding out the package, our State of the Art column takes a look at emerging technologies that are finding their way into the media. Personal digital assistants, personal communications networks and wireless technologies are paving the way for a new workforce of employees who are in touch but hardly ever present. We also take a look at multimedia and virtual reality.

We've covered a lot of ground in this issue. We hope it helps you pass the power of IT up and out of the IS department.

Marcia Blumenthal

CIO

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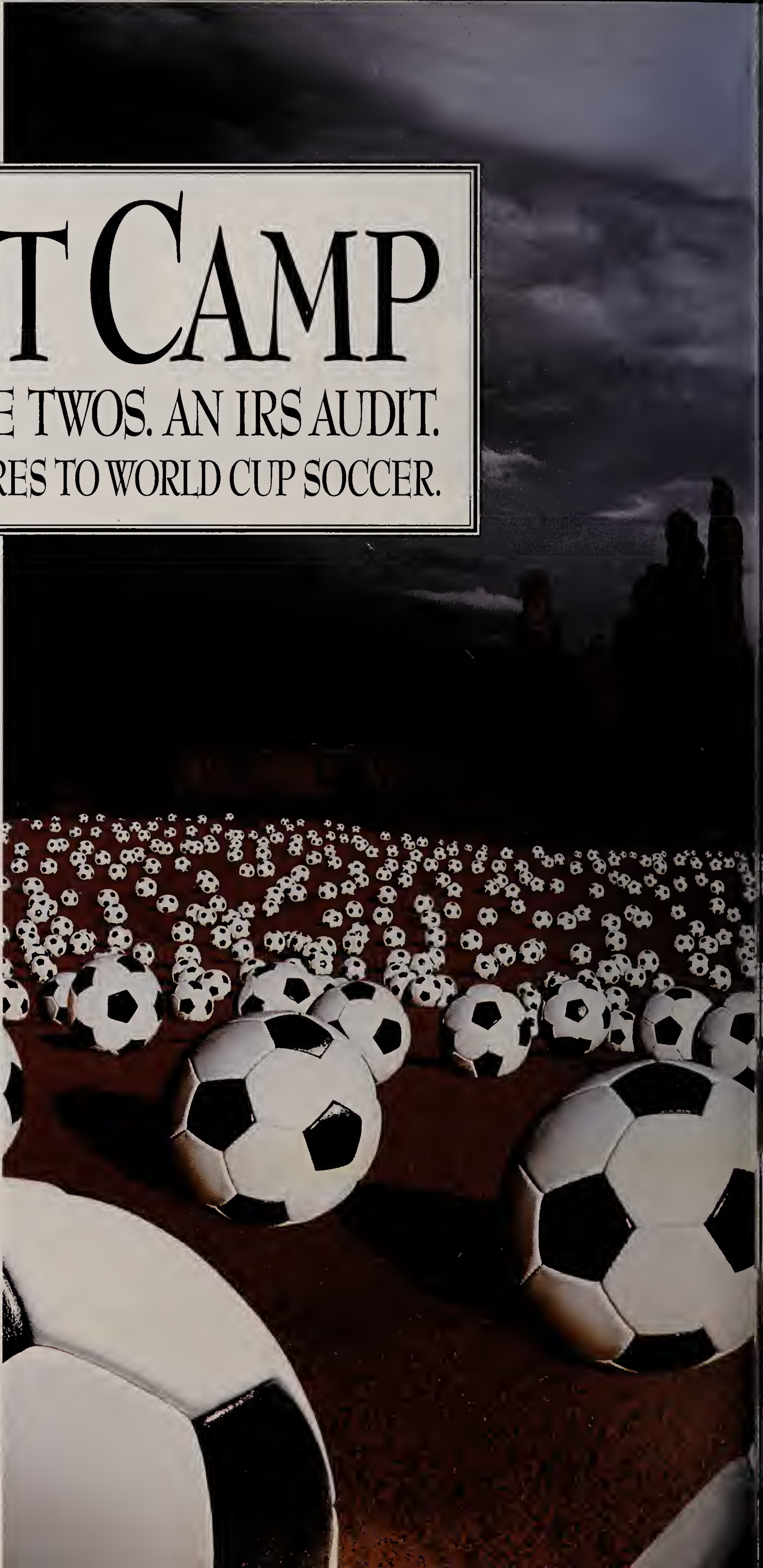

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"To set [an organization's design] in stone is absolutely antithetical to a marketplace where we don't know what's coming around the corner tomorrow afternoon."

—Tom Peters
Author and management consultant

In this issue of *CIO*, Tom Peters once again challenges our thinking, cautioning us not to treat reengineering as a panacea. Certainly reengineering business processes and organizational structures can produce positive results. But Peters believes that truly successful companies reinvent themselves each day based on new customer needs and opportunities, not just during corporatewide reengineering initiatives.

Peters uses Allan Webber's phrase, "work as conversation," to describe this process of constant rejuvenation. And he cites several organizations—CNN and EDS among them—that are actually doing it. Although their lines of business, size and customer issues may be different, these organizations share several ingredients: an intense focus on the customer; a flat organizational structure; and a corporate culture that allows employees to "go to the scene of the crime and/or opportunity without any bureaucracy, hierarchy or signings-off or checkings-with to get in the way."

Such flexibility is the hallmark of a handful of companies that Peters calls "the masters of tomorrow." To learn what work as conversation can mean to your company, please see Senior Editor Tom Kiely's interview with Peters on Page 24.

P.S. Please join Tom Peters and our other distinguished speakers at the next CIO Perspectives Conference, "Re-Visioning IT: Achieving an Enterprise Perspective," March 13-16 at the Hyatt Grand Cypress in Orlando, Fla. For more information, please see the conference supplement included with this issue or call our toll-free registration hot line at 800 366-0246.

PHOTO BY WEBB CHAPPELL

Coming In CIO

• •

An ROI Honor Roll

One of the challenges facing IS executives is justifying and proving the worth of proposed systems. Beleaguered CEOs want to know that investments in IT will pay off, whether in terms of costs cut or markets gained. At the same time, IS executives are trying to forge partnerships between IS and the business units in order to create systems that serve the company as a whole.

The first annual award for excellence in strategic partnering for return on investment from information technology, sponsored by *CIO* Magazine and Booz-Allen & Hamilton, recognizes six organizations that excel in both these areas. In a special issue, *CIO* will profile this year's honorees: AT&T Universal Card Services Corp., the South Florida Water Management District, Complete Health Services Inc., the Los Angeles County Department of Public Social Services, the Chicago Bureau of Parking and SynOptics Communications Inc.

• •

Coming Together

The staffs at Motorola Corporate Computer Services' two data centers were as different as winters in Phoenix and Chicago. But charged with eliminating duplication, they organized a project that brought together two largely hostile groups of employees and forged a creative, productive, compatible working unit.

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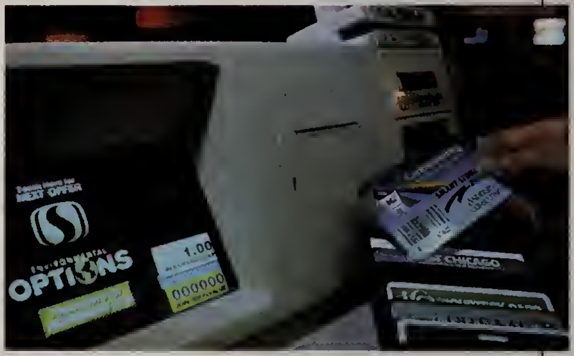
TRENDLINES

ELECTRONIC RETAILING

WHAT'S IN STORE

Now that everyone's a smart shopper, retailers won't make any money by selling dumb. There's a Sam Waltonish gleam in executives' eyes as they scan the horizon for ways to make their distribution processes more efficient and their stores more customer-friendly.

Many potential solutions are on display at Andersen Consulting's Smart Store—a veritable Tomorrowland of retailing. The purpose of Smart Store is to show executives in the food and consumer-goods industries how to organize their businesses and realign processes in order to become more consumer-driven and profitable. The permanent exhibit, located in a former Sears Roebuck & Co. warehouse in Chicago, showcases best practices in its simulated retail, distribution and manufacturing environments.



ANDERSON *Consulting's Smart Store showcases innovative approaches to retailing, including leading-edge technologies.*

PHOTOS COURTESY OF ANDERSEN CONSULTING

Visitors to Smart Store are led step-by-step through the process that links the production of goods to their eventual sale in a supermarket. The emphasis is on integrating what Andersen considers the "key components of any modern business": technology, people, business processes and strategy.

Smart Store addresses both the demand side of retailing (merchandising, marketing, selling and profitability) and the supply side (logistics and distribution). The exhibit is divided into sections—a warehouse, a store manager's office, the point of sale—each of which simulates an aspect of retail or distribution where people and technology make a contribution. In the middle of the exhibit is a seating area where visitors are encouraged to exchange ideas with Smart Store staff and with one another.

While Andersen argues against relying on IT as a quick fix for business problems, Smart Store is nonetheless a showplace for leading-edge technologies, from demographic-survey techniques to trolleys with built-in information pads. Besides including the latest products from major players like Digital Equipment Corp., Hewlett-Packard Co. and NCR Corp., Smart Store also features innovative technologies from lesser-known companies: for example, a new type of bar code

AN EASY SELL

Andersen Consulting's techno-visionary Smart Store has tapped into a prevailing business belief: In retailing, IT matters. A recent study of 422 senior business and IS executives in the retailing industry, conducted by Computer Sciences Corp. and *Retail Info Systems News*, shows that CEOs and functional vice presidents are highly supportive of IT. More than 75 percent said their companies have achieved an appropriate return on their IT investments, and 98 percent believe that IT is somewhat or very critical to success in retailing.

Asked to name their most-critical IS activities or strategies, respondents cited integrating systems, improving systems development, capitalizing on advances in IT, reengineering and developing an IS strategic plan.

Retailers also indicated several areas they were targeting with IT applications, most commonly store-labor scheduling, frequent-shopper programs and merchandise replenishment.

Other findings include:

Convenience stores, feeling the heat from grocers and fast-food chains, are accelerating their investments in IT—particularly in bar-codes and scanners.

Chain drugstores, which long relegated IT to the back room, are now using it as a weapon in stores and warehouses.

Department stores and discounters are being more circumspect in their IT investments. ■

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Retailing has been suffering across the Atlantic as well, and Andersen has responded with Smart Store Europe, which opened recently in Windsor, England. The European showcase resembles its Chicago counterpart but addresses specific European issues, such as European Community regulations, language and food differences, and cultural disparities. "It is a European window on world-class practices," says John Hollis, an Andersen partner in the United Kingdom. "Until you have seen it, you cannot appreciate it." ▬

Bodies of Knowledge

It's not that Dade County made a habit of misplacing corpses. That's only happened three times since 1957. But with so many bodies passing through the Medical Examiner's Office—more than 3,500 in 1993—the possibility of Aunt Bertha being sent to the wrong funeral home was always present.

The obvious solution: bar-coded toe tags.

The Medical Examiner's Office wanted to make sure that the right bodies go to the right funeral homes accompanied by the right valuables and clothing. Now, when a corpse arrives at the morgue, it is assigned a case number; preprinted labels encoded with that number are placed on all files and items associated with the deceased—including the toe tag that identifies the body. Employees enter into the office's computer system such personal information as name, age, sex and date of autopsy.

When a funeral-home representative arrives to pick up a body, an employee scans a release form, then the bar-coded toe tag. If everything matches, the employee uses the same technique to check for clothing and other belongings. But if they don't match up, the system sets off an audible alarm. "The main thing is that when we go to release the body, it gives us assurance that we haven't transposed any numbers," says Scott Hanks, forensic morgue supervisor.

The Dade County system should be fully operational by Jan. 1. ▬

Cherchez la Femme

Women interested in traveling the information superhighway will soon have a roadside meeting place where they can exchange ideas with other women from around the world.

The Women's Information Resource & Exchange (WIRE), due to come online early this year, is the first international, interactive computer network dedicated to women. Users will be able to access databases, discussions, abstracts and advice from experts on health, politics, careers, finance, technology, parenting, education, life-styles and other issues. WIRE will also link to the Internet, allowing users to communicate via E-mail and to participate in newsgroups and mailing lists from other systems on the Internet.

As part of their mission to educate more women about networking, WIRE's organizers will provide free customer support. A graphical user interface will be available for Macintosh, Windows and DOS computers; users can also choose a command-line interface.

WIRE Networks Inc., based in San Francisco, is currently seeking a limited number of founding subscribers to help shape the network's development. These early users can access the service immediately for $15 per month, which includes two free hours online, plus $2.50 for each additional hour. The company can be contacted at 415 615-8989 or via E-mail at info@wire.net. ▬

Paper View

You don't have to be a fan of tabloid TV to want a little hard copy in your living room. If you like a product featured on an interactive shopping channel, for example, you may want to flip through the brochure before buying.

Anticipating such a demand, Time Warner Entertainment and Hewlett-Packard Co. have announced a new home printing service for subscribers to Time Warner's Full Service Network, which is currently in development. Subscribers

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CIO

THE MAGAZINE FOR INFORMATION EXECUTIVES

THE CIO PERSPECTIVES℠ SERIES

Re-Visioning IT: Achieving an Enterprise Perspective

MARCH 13–16, 1994
HYATT GRAND CYPRESS
ORLANDO, FLORIDA

Featuring
TOM PETERS
Masters of Tomorrow
and
The New IT Professional
A Global Visionary Perspective
The Corporate Portfolio Balance
The New Frontier
Healthcare Reform & IT
Immutable Marketing Laws
Mental Toughness

CIO PERSPECTIVES CONFERENCE

Re-Visioning IT: Achieving an Enterprise Perspective

MARCH 13–16, 1994 • HYATT GRAND CYPRESS • ORLANDO, FLORIDA

The CIO position is in turmoil. Corporate leaders are demanding more broad-based business experience and knowledge from their top executives. Managers without any technology background are taking over IT. Meanwhile, in the US, turnover among CIOs continues to escalate.

Future successful CIOs must achieve a new understanding and a different outlook on their businesses...an enterprise perspective. They must master business and industry concepts. Furthermore, in order to maintain their ability to support the business and to grow into strategic planning and leadership roles, they must evolve into business-based strategists.

Whether you have already begun this transformation or need to begin, plan now to join us for the tenth program in our CIO Perspectives series, **Re-Visioning IT: Achieving an Enterprise Perspective**. Our keynote speaker will be Tom Peters, best-selling author and president of the Tom Peters Group. Tom's newest book is "Liberation Management."

As Peters says, "Adjust or else. Fifty percent of the Fortune 500 companies of 1980 bit the dust in the subsequent decade. The trick is turning front-line employees into experts and finding other routes to honor expertise without creating cumbersome staff structures that gum up the works. Learning to be more expert than ever in non-bureaucratic ways is a tough puzzle to solve. Yet no task is more important to tomorrow's managers."

The CIO must survive management fads; learn how to mentor; and reevaluate staff compensation packages to reflect the lateral movement and "broadbanding" necessary as management layers flatten. Additionally, tomorrow's successful CIOs – IT "re-visionaries" – will capitalize on...

- Knowledge of standard business concepts and accounting practices;
- Understanding of the enterprise's market and industry;
- Internal partnering;
- Vendor alliances; and
- A new perspective on IT for both leadership and supporting roles.

In general and concurrent sessions...
Informal peer-to-peer gatherings...
During meals and planned activities...

...innovators, leaders and visionaries will talk about their strategies and plans for re-visioning information technology in their own enterprises.

Plus, a select group of innovative, top-quality companies will display a wide range of IT solutions to management problems. You will see technologies such as videoconferencing and wireless communications, business reengineering and consulting services, outsourcing, distributed computing, information engineering, backbones, industry and market research, databases, vertical market application software, microcomputers, workstations, and operating systems.

COMPANION PROGRAM

Participation in the companion program includes all scheduled receptions, meals and entertainment. Companions must be enrolled in the program for involvement in any conference-related activities.

ATTIRE

Casual. Please, no suits, ties or business attire.

GOLF & TENNIS TOURNAMENTS

Grand Cypress Resort is the home of 45 holes of Jack Nicklaus-designed golf. Our tournament will take place on the *New Course*, designed after the Old Course at St. Andrews in Scotland.

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Southeastern Insurance Group

"A unique combination of information, education, entertainment and a chance to interact with terrific people."
Richard S. Padilla
Weyerhauser Company

CONFERENCE AGENDA

Sunday, March 13

Conference Registration

Welcome Reception

Monday, March 14

Breakfast

Welcome & Opening Remarks
Joseph L. Levy
President & Publisher
CIO Publishing, Inc.

Re-Visioning IT: The Corporate Perspective
Conference Moderator
Robert J. Benson
Associate Vice Chancellor
Computing & Communications
Professor, Information Management
Washington University
St. Louis, Missouri

Achieving Customer Intimacy
John Biggs
Head, Hyatt Technology Center
Hyatt Hotel Corporation

Coffee Break

The Emergence of the New IT Professional
Sharon Heldorfer
Vice President, Field Operations
Property & Casualty Claims Division
The CIGNA Companies

A Global Visionary Perspective
Panel Discussion moderated by
Marcia Blumenthal
Editor-in-Chief
CIO Magazine
Panelists:
Ken Harris
Vice President
Worldwide Information Systems
Kentucky Fried Chicken

Bobby Martin
President & CEO
Wal-Mart International
A Division of Wal-Mart Stores Inc.

John Biggs

Luncheon

Networking

Reception

Dinner

Tuesday, March 15

Breakfast

The New Frontier
Ralph Szygenda
Vice President & CIO
Bell Atlantic Corporation

A Visionary Perspective on Systems Downsizing
Charles H. Mayer
Managing Director & CIO
CS First Boston

Achieving Balance in Your Corporate Portfolio: An Interview with Hal Rosenbluth
Hal Rosenbluth
President & CEO
Rosenbluth International

Coffee Break

Concurrent Sessions
Each Corporate Host will deliver a concurrent session presentation on a specific application or relevant topic.

Coffee Break

Masters of Tomorrow
Tom Peters
President
Tom Peters Group

Reception with Tom Peters

Wednesday, March 16

Breakfast

Immutable Marketing Laws & the Vision Thing
Al Ries
Chairman, Trout & Ries

The Administration's Healthcare Reform Policy: IT Implications
Dr. John S. Silva
Program Manager
Advanced Research Project Agency (ARPA)

A New Definition of Leadership
John L. Sullivan, Jr.
Vice President & Managing Director
Korn / Ferry International

Coffee Break

Mentally Tough: Reaching Peak Performance on Demand
Dr. Jim Loehr
President
Loehr Groppel Saddlebrook
Sport Science Center

Summary

left: Bob Benson
Conference moderator

right: Tom Peters
Keynote speaker

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SUNDAY, MARCH 13–WEDNESDAY, MARCH 16, 1994 • HYATT GRAND CYPRESS • ORLANDO, FLORIDA

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Enrollment Fees

Prior to JANUARY 15, 1994

- ☐ **IS Practitioners/Executives:** If you are a CIO, IS executive or hold another executive position, the fee is $1,195.
- ☐ **Government/Military**: The fee, which includes your hotel for three nights, is $1,595. CIO will make your reservations.

On/after JANUARY 16, 1994

- ☐ **IS Practitioners/Executives**: If you are a CIO, IS executive or hold another executive position, the fee is $1,295.
- ☐ **Government/Military**: The fee, which includes your hotel for three nights, is $1,695. CIO will make your reservations.
- ☐ **Sales/Marketing/Consulting**: If you are in a sales, marketing or consulting position, the enrollment fee is $5,000.

Fee includes conference sessions, concurrent sessions, corporate host displays, conference materials and scheduled food and beverage. Transportation and hotel are your responsibility.

Hotel Accommodations

A block of rooms has been reserved at the Hyatt Grand Cypress. We urge you to make your reservations early by calling the hotel at 407/239-1234. Be sure to identify yourself as part of the CIO conference to receive the conference rate. Hotel reservations/cancellations and charges are your responsibility, except for government/military participants.

Transportation

American Airlines is the official conference carrier. Call 800/433-1790 and reference STAR file #S0934D5. AVIS is the official rental car company. Call 800/331-1600 and reference the Avis Worldwide Discount (AWD) #B794336. Shuttle bus transportation is available from the Orlando International Airport.

Cancellation

You may cancel your enrollment up to 3/4/94 without penalty. *No refund or credit will be given for cancellations received on or after 3/5/94.* You may send a substitute in your place.

Other Activities

Monday afternoon activities include:

☐ Golf Tournament	$ 156.00
☐ Tennis Tournament	Complimentary
☐ Sea World Tour (Attendee)	$ 47.00
☐ Sea World Tour (Companion)	$ 47.00
☐ Companion Meal Program	$ 199.00

Companions must be enrolled in the Meal Program to attend any conference-related functions. (Includes all scheduled food and beverage functions. It does *not* include conference session attendance.)

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Conference Moderator:

Robert J. Benson
Washington University
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Hal Rosenbluth
CEO, Rosenbluth International

Ralph Szygenda
CIO, Bell Atlantic

Dr. John Silva
Project Manager, ARPA

Sharon Heldorfer
VP, Property & Casualty Claims
Field Operations, CIGNA

John Biggs
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The service is made possible by new HP technology that enables video images from any source to be printed on plain paper quickly and inexpensively. "We think this will dramatically change the way people communicate with video," says James D. Olson, general manager of HP's video communications division. ▬

SCREEN SAVERS

AND NOW, A WORD FROM OUR SPONSOR

For companies deciding whether to outsource or debating the merits of OS/2 and Windows NT, the subject of screen savers might seem invitingly warm and fuzzy.

Think again, folks. The products, which prevent characters from burning into an idle computer's screen by overriding them with soothing images of floating fish or romping kittens, are becoming increasingly commercial and downright controversial.

Take, for example, the recent well-publicized run-in between Berkeley Systems Inc., creator of the infamous flying toasters, and cartoonist Berke Breathed. Berkeley filed suit when rival software maker Delrina Inc. came out with a screen saver featuring Opus, Breathed's celebrated Everypenguin, blasting winged toasters from the sky. A federal judge has issued a preliminary injunction against Delrina, citing copyright infringement.

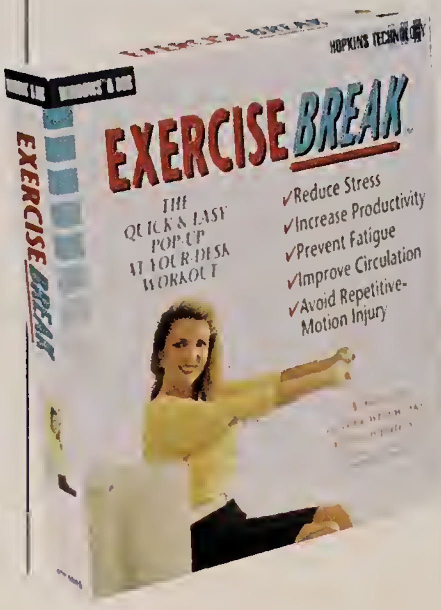
The suit has had a chilling effect. "We were planning to launch a screen saver where people could get rid of [another popular screen saver], the Energizer Bunny," says Jeff Oster, a partner at Screen Team, a division of Home Run Software Productions Inc. in Claremont, Calif. "[They could] skin him or shoot him or whatever. But when we saw what happened to Delrina, we decided not to."

Besides hunting "wabbits," Screen Team is at the forefront of the move to turn screen savers into promotional devices, a development that some critics have attacked as more intrusive than television commercials. But Oster sees only opportunity. He points out that there are 170 million installed PCs, and "each and every one of those machines becomes idle during every day of the week and therefore becomes a blank billboard in search of an advertisement."

FLEX TIME

Richard Simmons reached out to the old and out-of-shape. Jane Fonda considered the needs of pregnant women. Isn't there anyone out there worrying about the atrophying muscles and cardiovascular needs of the average computer programmer?

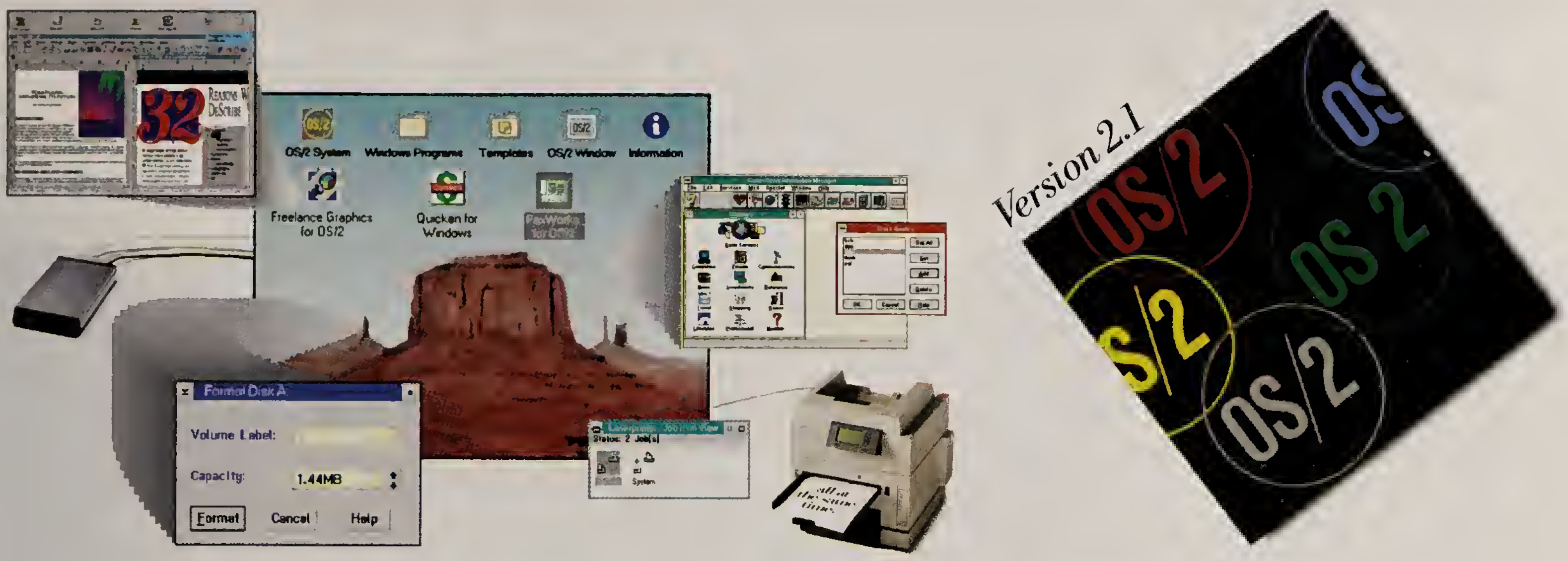
Hopkins Technology cares. The software firm, based in Hopkins, Minn., has created ExerciseBreak, a program that helps PC users let their fingers do the stretching. Users design a customized, online exercise program by scheduling regular breaks at their desks and selecting from more than 50 routines to exercise specific muscle groups. More than 70 anatomical illustrations—many presented in animated sequences—demonstrate proper stretching techniques. Instructions and graphics guide the user through each step.



ExerciseBreak focuses on body parts that are subject to stress during desk work: back, shoulders, wrists, hands and legs. The goal is to help users reduce stress, prevent fatigue and improve circulation. The product also provides illustrations of proper ergonomic posture and directions on how to set up a work area to minimize the risk of repetitive-motion injury.

The package costs $29.95 for Windows and DOS, $39.95 for Macintosh. To order, call 800 397-9211. ▬

PHOTO COURTESY OF HOPKINS TECHNOLOGY; ILLUSTRATION BY BETHANY GULLY



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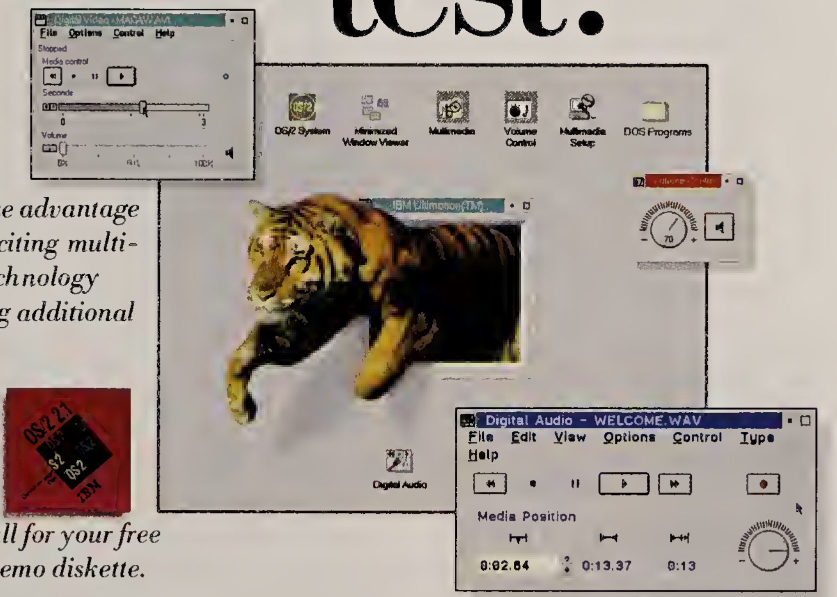

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If a program "crashes," can you recover without rebooting your computer? Can you run the new generation of 32-bit programs? If you answered no to any of the above, then it's time to say yes to a higher grade of PC performance.

Demand OS/2 2.1 preloaded on your next PC. With OS/2 2.1 in your PC, you can get a lot more out of your PC. It's simply a question of multiple choice. OS/2 2.1 lets you choose from the broadest range of PC programs available, and lets you get more from them than ever before. So there's only one final question: what are you waiting for?

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TRENDLINES

Screen Team's pitch: It will create customized screen savers, incorporating 3-D, animated corporate logos and advertising messages that can be handed out to customers or used in promotions. The company is currently working on a screen saver for Ford's new car line and on a McDonald's "scratch and win" game for kids, among others. Baskin-Robbins, Texaco, TWA and Hyatt are just a few of the companies that have signed on.

Some of the screen savers the company creates are more subtle—and consequently more insidious—than a bunch of products and logos dancing across a screen. For example, a company can choose to send out time-released messages using a computer's internal clock. You could advertise the company picnic, say, or your corporate mission statement. *Or*, you could provide images of a dewy can of Coke or clips from a soon-to-be-released video.

Taking that tack a step further, Oster says his company has also been approached about doing screens with subliminal messages. And although he says he can't talk about it right now, "the movie studios are very interested."

THE CLOCK ISN'T TICKING

Swiping the card is now the Information Age equivalent of punching the clock for hourly employees who use the Time+Plus time-management system.

BOSS International Ltd. of Marietta, Ga., now offers the automated timekeeping and payroll system as a labor- and money-saving alternative to traditional time sheets or clocks.

Personal cards with magnetic strips or bar codes are issued to employees, who simply run them through a card-reader terminal. Data is automatically transmitted to a central location where paychecks, timekeeping and government reports are generated. Time+Plus collects hours worked, produces detailed management reports and computes all federal, state and local taxes.

The company markets a system for organizations with more than 100 employees that typically want to maintain timekeeping and payroll functions in-house. It also has a system for smaller companies interested in outsourcing activities through Time+Plus offices located nationwide. For more information, call 404 641-7757.

OFF THE SHELF

SO, WHAT'S YOUR POINT?

By James C. Wetherbe and M. Bond Wetherbe
Mead Publishing (Minneapolis), 1993
155 pages, $24.95 plus shipping and handling (hardcover)

According to James and Bond Wetherbe, co-authors of *So, What's Your Point?*, 80 percent of the problems in work and personal relationships are really just misunderstandings. If only we could all communicate more effectively, they believe, we would find that we really don't disagree much after all.

How do you achieve this nirvana of accord? "Assume 100 percent of the responsibility for understanding what the other person is saying and means [and] 100 percent of the responsibility for making sure that the person you are communicating with understands you."

This does not come naturally. Like novice skiers who lose control by leaning backward rather than into the slope, we are led astray by our natural inclinations. Similarly, when people make mistakes, they are inclined to deny their guilt, even though accepting responsibility would place them in a much better light. In communication as in sports, you must learn the basics and practice, practice, practice!

The Wetherbes have worked out a formula for learning to communicate more effectively. First of all, they suggest, you must distinguish between content and process. "Content deals with what you are communicating. Process deals with how you are communicating. It is important to know that process will preempt content." A boss who says, "When you have a minute would you stop by my office?" will get a subordinate to move just as fast as one who says, "I want to see you in my office ASAP!"—and generate much less resentment.

So, What's Your Point? delves into human behavior (such as the tendency to assume that other people know what you know or can read your mind), psychology and the weaknesses of the communication process. It then suggests ways to remove whatever obstacles might stand in the way of clear communication and understanding. For example, if you're trying to overcome someone's objections, the authors recommend first finding some basis for agreement. That way, you can move the person with whom you're conversing from a doubting to an agreeing frame of mind before proceeding with the discussion.

The steps involved make perfect sense (who would argue against explaining a problem before discussing the solution?), but they really don't come naturally. This book sets forth clear guidelines for (as the lengthy subtitle says) "how to be persuasive, overcome objections, avoid misunderstandings, and minimize arguments in interpersonal communication." It's up to the reader to internalize the steps and practice, practice, practice!

So, What's Your Point? is only available through special order. Call 612 449-4807.

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UNCONVENTIONAL WISDOM

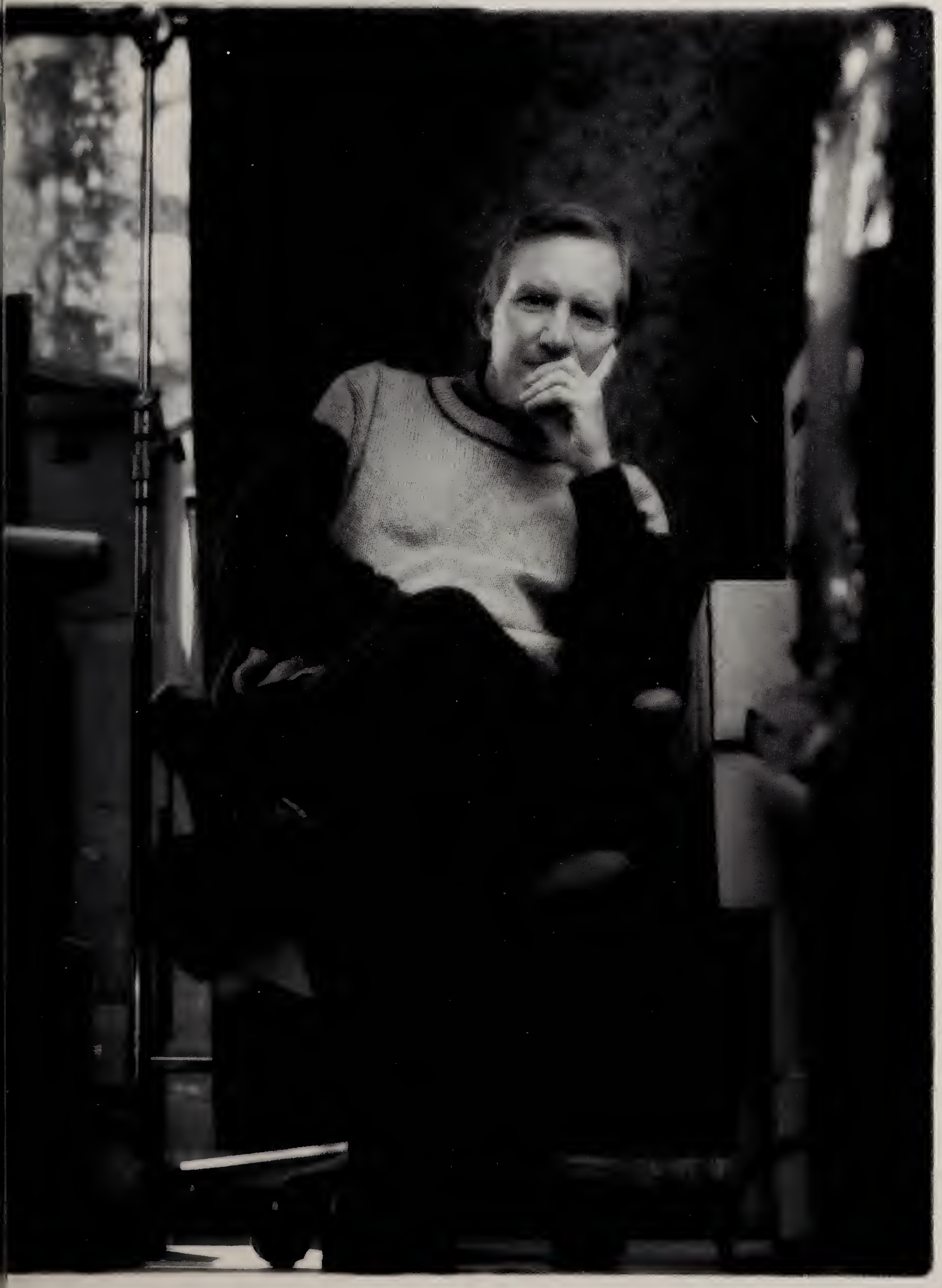
Management guru Tom Peters argues that companies looking for the one true path to reorganization are going to end up stuck in place while the nimble, protean world whizzes past

BY THOMAS KIELY

TOM PETERS hardly needs an introduction. Along with Peter Drucker (and, arguably, Michael Hammer), Peters has the kind of brand-name recognition in his market—call it corporate cognizance—that a consumer-product outfit would die for. A former McKinsey & Co. consultant and co-author of the phenomenally successful business book of the 1980s *In Search of Excellence*, Peters has developed a reputation as an original and controversial observer of management trends. In his latest book, *Liberation Management: Necessary Disorganization for the Nanosecond Nineties* (1992), Peters assays today's fast-changing markets and suggests that organizations seeking models for success in the years ahead will find them in the work of small, nimble project teams. His thoughts along these lines are also plumbed, broadened and proselytized by the Palo Alto, Calif., management-consulting firm that bears his name.

In October, Peters talked with *CIO* Senior Editor Thomas Kiely about the hottest management fad of the moment, reengineering. As usual, Peters' take on the issue is anything but predictable.

PHOTOGRAPHY BY DAVID POWERS

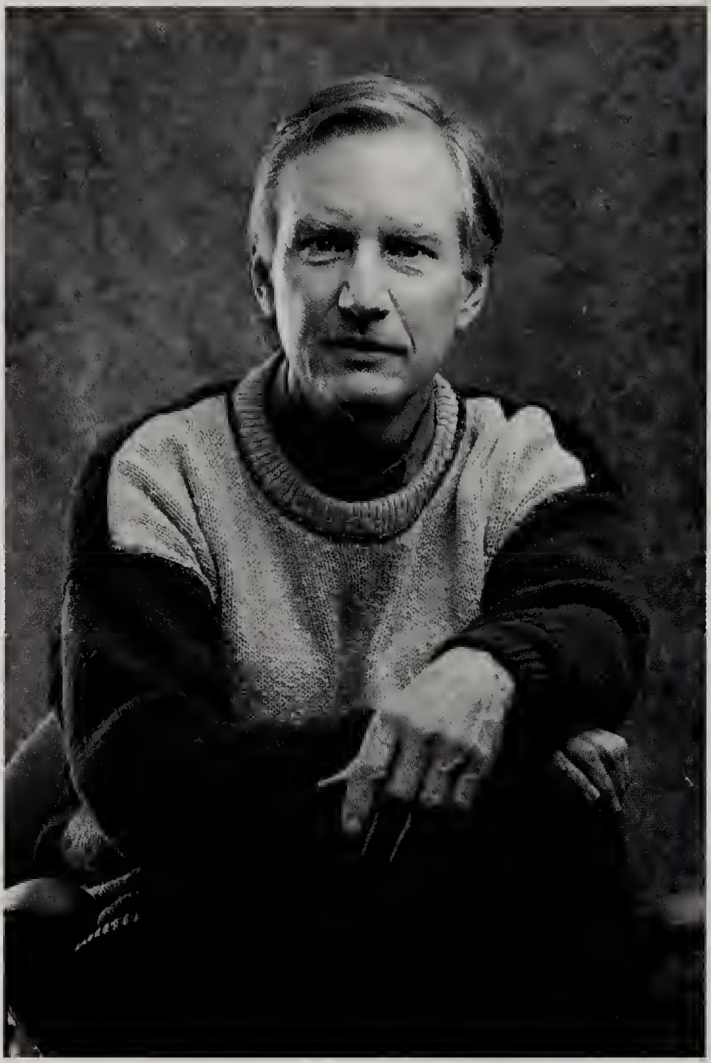


CIO: *Recently, in your columns, you've thrown a few stones at the reengineering fad. We'd like to hear more. But first, can we start with some basics? How do you define reengineering? And what's so bad about it?*

PETERS: I fundamentally disagree with some of the basic tenets of reengineering. For 150 years we've followed, in effect, the Taylor model (although it wasn't invented 150 years ago) of organizational design—or, if you will, the vertical model, the functional model, the hyperspecialization model. We have reached this junction in time where that model can no longer stand up in a fast-paced marketplace. The essence of reengineering, as I see it, is first hooking functions together horizontally rather than vertically; and, second, reinventing the organization as you go horizontal in order to take 24 steps out of a 25-step process.

The bone that I have to pick with reengineering is that its root word is "engineering." I'm terribly fearful we are approaching the era of what I'll call neo-Taylorism. That is, reengineering becomes the new, "one best way" to organize horizontally, forever, as opposed to the old, one best way to organize vertically, forever. And that's what I think is wrong.

I find it humorous—as I did with the "excellence" stuff 12 years ago—that people talk about reengineering as something that applies to everything from brushing their teeth to recreating the corporation. They use reengineering as some kind of generic catch-all, capture-all, reinvent-the-planet notion, and I think that is purely nutty.



People "use reengineering as some kind of generic catch-all, capture-all, reinvent-the-planet notion, and I think that is purely nutty."

CIO: *What's so bad about a one true path to a new model? Why is it so bad to set into stone, as it were, a horizontal model that replaces a vertical model?*

PETERS: To set an organization's design in stone is absolutely antithetical to a marketplace where we don't know what's coming around the corner tomorrow afternoon. That's the major problem as I see it. If ever there was a wrong time for that, it is now. Don't get me wrong; I think reengineering is a fabulous idea. Ninety-eight percent of what companies will do in a reengineering effort is useful. To get organized horizontally, to take the 24 steps out of a 25-step process, to enlarge people's jobs and give them the tools and the wherewithal to act in a much more encompassing fashion—all that is good stuff. But, unfortunately, just as with the quality movement, the kind of reengineering that really goes on in companies is something different.

Look, this is also true for total quality management or customer satisfaction or customer listening or anything else. What Dr. Deming talks about and what his disciples do bear little relationship to each other. And increasingly, we're finding precisely the same gulf between what Michael Hammer talks about and what his disciples do. Hammer is a very smart guy. If he and I were having a conversation, I doubt that we would disagree very much at all. I doubt that if Deming and I were having a discussion, we would disagree very much at all. But the truth of the matter is, the average Deming company has taken on the numerical part of quality improvement and yet doesn't pay much attention to employees and customers. And reengineering, as done by the mechanical types in corporations, has the chance of going down that same primrose path.

My problem with reengineering is that it isn't biological; and I think this is the age of biological models of organization, if you will—not mechanical models. I'm keen on companies such as CNN, which are creating something organic, something that recreates itself, reinvents itself each day. That is work as conversation—as Allan Webber used the phrase in a *Harvard Business Review* article [January/February 1993].

CIO: *What do you mean by work as conversation?*

PETERS: At VeriFone Inc., the company that apparently has a 60 percent market share in credit-card authorization, literally everybody is wired up. A percentage of its employees are registered with the SEC so that they can have access to all the insider data that the company has available to it.

VeriFone smells a lot like CNN to me. Work as conversation happens at a place such as CNN that—de facto—reinvents itself each day on the basis of the customer opportunities that pop up. That is what, I think, Brook Manville is trying to do, too—and perhaps is further along than anybody I've ever met. [Brook Manville is co-director of information and technology at McKinsey & Co., which places a heavy business emphasis on collaborative computing as a means of increasing productivity. See "Learning to Share," *CIO*, July 1993.] It means that when I walk in to work this morning I don't know what the world is going to be like, but I do know that I've got some systems in place—*and* the right kind of corporate culture—that will allow people to instantly go to the scene of the crime and/or opportunity without any bureaucracy, hierarchy or signings-off or checkings-with to get in the way.

"I hear about people talking about reengineering the church, for Christ's sake."

CIO: *Companies that are reengineering generally aren't healthy, anyway. They may need something concrete.*

PETERS: Sure. Again, don't get me wrong—there's a lot of nuts-and-bolts work that needs to be done, about which I'm not critical. But reengineering is not the answer to a company's problems. I can tell you that I was consulting last week with a giant health-services company. I suppose you could say we were talking about these issues, but as it ended up, we spent about 95 percent of the day talking about what was going on in the marketplace, and about its strategy, which was a pretty complicated one. Reengineering is a second-order issue, not a first-order issue. The first-order issue is Peter Drucker's 25-year-old admonition to ask, "What business are you in?" Nine out of 10 companies can't answer that today. I can't blame them for not being able to answer that, because the world is changing so damn fast.

But everything gets lumped into that reengineering bag. I hear about people talking about reengineering the church, for Christ's sake. It's madness, just as the quality mania was madness four or five years ago. The United States Naval Academy has a major vision statement about TQL—or total quality leadership—which it, in theory, took from Dr. Deming. But right now the Academy is mired in a major cheating scandal, which suggests it doesn't have its priorities straight. You know, it may be doing statistical process-control charts on how early in the morning the midshipman says his prayers, or whatever, but it's missing the basics. They may be reengineering, but they're missing the basics. And that's my concern.

CIO: *So easy prescriptions may be the surest path to hell? But how does an organization get the nuts and bolts done in an organic fashion?*

PETERS: People have to learn to go with the flow and realize that there are no answers that will last for eternity. It would be very nice if there were eternal answers. Maybe it almost made sense for GM's Alfred Sloan, in 1922, to create an organizational structure for the age. It *did* hold up for about 40 years, which is pretty phenomenal. But the paradox—the irony—is that this is the worst of all times for a quick-fix mentality. And yet, as you suggest, with so many companies in trouble and scared to death, there has never been a greater market for quick-fix salesmen. I'm not denigrating Hammer when I say that, because I put myself into this camp, too—along with Ken Blanchard [*The One Minute Manager*] and the guy who wrote the book on what Attila the Hun ate for breakfast. There is this insatiable appetite out there for quick fixes at exactly the wrong time.

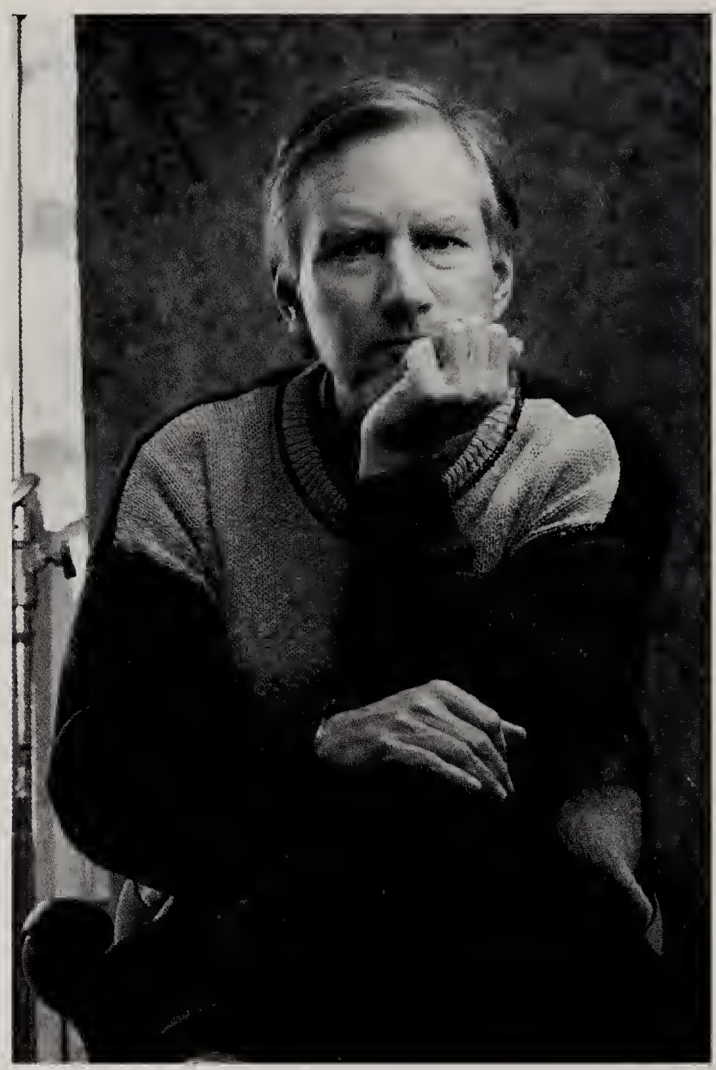
CIO: *But for managers who are process-oriented, that's got to be scary. And work as conversation is probably easier to pull off in a smaller company.*

PETERS: It's scary as hell. But when you look at models for tomorrow, some of them are not chicken-feed-sized companies. You could argue that EDS is a buttoned-down institution, and I would be hard-pressed to disagree with you. But they are remarkably flexible in their ability to bring resources to bear on an opportunity when it raises its head; and they do so with 70,000 to 80,000 people on the payroll. So this more-open way of doing business is not restricted to 10 or 15, or even 150 people. It can be pulled off with tens of thousands of people.

And *that* is the real trick, I believe. Those who master that trick will be the people, in my opinion, who are the masters of tomorrow, whether they're in biotech, software or the travel-services business. See, my bias is that these so-called professional-service firms, like McKinsey, are probably the harbinger for virtually all of tomorrow's organizations. It took me 10 years to realize that—it wasn't something I recognized while working on the inside of McKinsey. But professional-service firms by definition are groups of people who own essentially no assets and create fabulous value out of the mind, out of their ability to reorganize regularly.

And that's the real wicket that I'm on. Knowledge management, if you will, is the big ball game for the '90s. I have no idea what the answers are. But the answer is *not* total quality management, and it is *not* reengineering—even though one aspect of reengineering is terribly important, which is that it is a convenient and best-selling handle for finally destroying the remnants of functional bureaucracy.

CIO: *But Tom, while the companies you like, such as CNN, McKinsey and EDS, are leaders in these new management issues, most companies, in comparison, seem to be very, very far behind. The impression I have is of an enormous gulf between the few and the many. Is that accurate? And is that really a fair—I mean an unexaggerated—estimate of the corporate landscape today?*



"There is this insatiable appetite out there for quick fixes at exactly the wrong time."

PETERS: Yes. And you're absolutely right. I can't imagine a time when there has been such a gulf between leaders and others, except maybe at the beginning of the industrial revolution. It's funny: We publish a monthly newsletter, and we get our jollies looking at leading-edge stuff. And then our reader surveys keep telling us over and over again that people want more-basic information. Even though we've run four cover stories in the newsletter recently on how to do teams, reader surveys ask, "How do you do teams? Get off this leading-edge stuff and tell us how do you do a team."

So the problem is, can a company move through this process in a linear, one-step-at-a-time way, or is it possible to skip steps and go to the CNN/McKinsey/VeriFone/EDS sort of model more-or-less overnight, without doing the other basics? I don't know the answer to that. I'm afraid it's closer to the linear end—that you've got to take it one step at a time. But the problem with that is—and this gets me back to this oversimplified version of the reengineering idea—every time you go linear, you strike a blow in implicit support of people who are rigid and hierarchical in their thinking. And I don't think rigid, hierarchical people or rigid, hierarchical companies are going to survive in the next 25 years, whether they are in Japan or Germany or in the slightly looser United States.

It also comes back to the way one does one's consulting. Frankly, I'm not sure how much of a favor you're doing companies when you give them the help that they ask for that seems so legitimate but is mechanical, linear. The linear thinkers, I think, ain't very much longer for this world. CIO

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FIVE UNE

STORYLINE

To date, great mountains of prose have been heaped up around the key trends, tactics, principles and prescriptions of the moment. Much of that prose has been beguilingly upbeat. And, indeed, many companies do profit handsomely from their investments in empowerment, total quality management, reengineering, downsizing and outsourcing. But almost every promising strategy can also be a dangerous fad; success requires knowing where the dangers lie. *CIO*'s editors have culled the archives to identify a roster of pitfalls that can put at risk the manifest opportunities of five of today's leading management trends. You've read the hype. Now examine the fine print.

1 Empowered Work Teams

The trendline: The team is replacing the erg as the unit by which many modern businesses leverage the promise, profit and productivity of human labor. Teams represent the dismantling of obsolete corporate hierarchies and the embodiment of all that the best big thinkers (such as Peter Drucker, Tom Peters, Rosabeth Moss Kanter and Peter Senge) believe will forge nimble, flexible, innovative and creative pathways to competitive success. Organizations as diverse as Corning Inc., Pacific Gas & Electric Co., Chrysler Corp. and Sara Lee Knit Products have invested seriously in creating team-based work styles (also known as employee-involvement programs). By some reckonings, most Fortune 500 companies have at least dabbled in empowered teams.

How they work: In theory, empowered employees, assembled as teams, possess the authority to make decisions affecting their work and to participate in the larger decisions that determine organizational direction.

What empowerment promises: The well-publicized potential benefits of these self-managed teams include higher productivity and quality; faster, more-flexible product development; greater employee satisfaction; a heightened understanding of customer needs; and a more-accurate knowledge of internal business processes.

The pitfalls: A botched empowerment effort "is not just a lost opportunity," consultant Thomas Kuczmarski told us last year. "It can inflict a real wound on the organization."

- A bogus team structure is far worse than having no teams at all. Among the possible wounds is a credibility hemorrhage resulting from contradictions between organizational words and deeds. If a company creates team structures but does not give team members the authority to make decisions, team members will quickly see through the sham. (For example, some managers set up teams whose role is to "discover" a decision the manager has already privately made.)

Long-term employee-relations damage can result—exactly the opposite of the promised benefit. "I go out to talk about empowerment [in companies] with existing teams," another teamwork consultant recounted. "And the team members just laugh." This presumably is bitter rather than happy laughter.

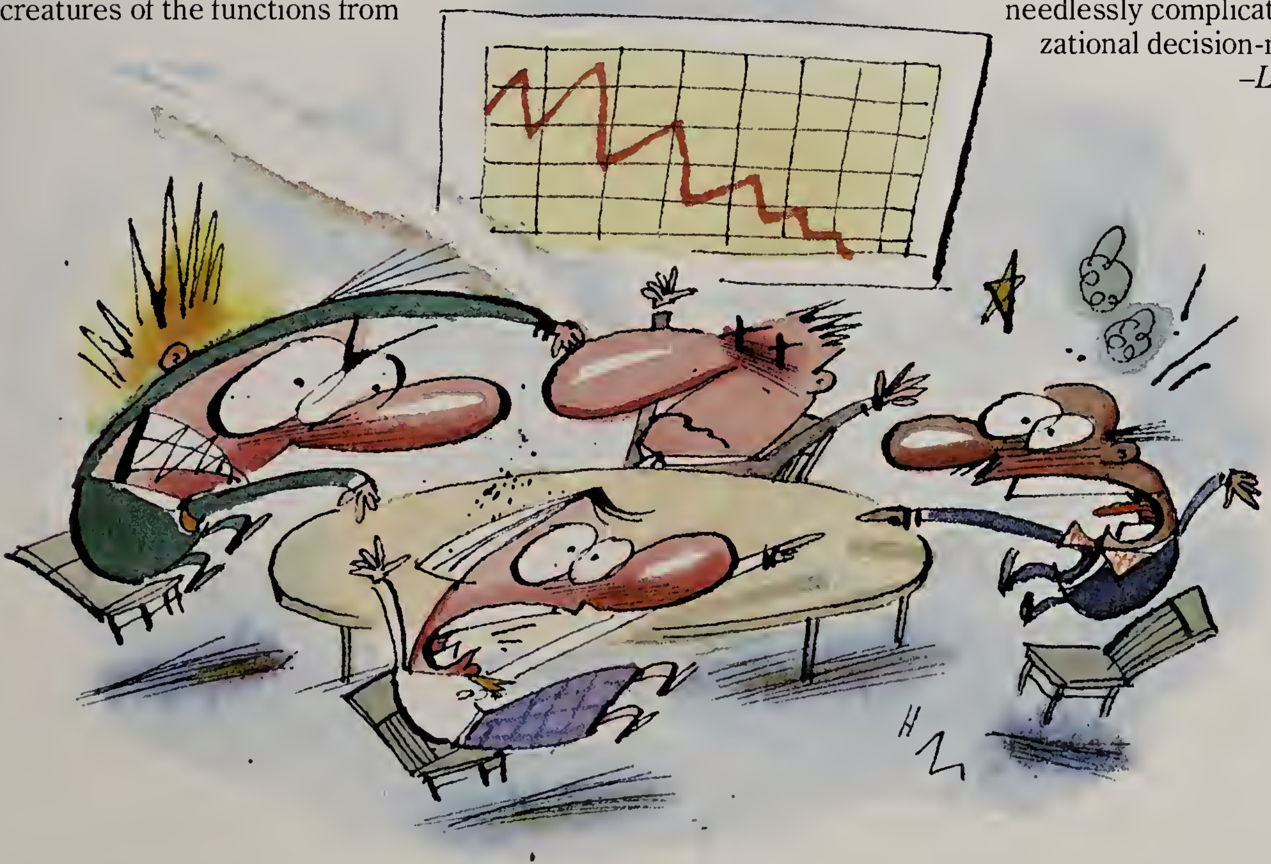
- Even an organization that creates genuinely empowered teams can founder if conflicting allegiances are

ASY PIECES

not dissolved. When teams are cross-functional, as opposed to function-specific, they ostensibly owe their allegiance to the project around which they have been assembled. Problem is, in most companies they are all still very much the creatures of the functions from which they were drawn: They report to the function head, by whom their performance is evaluated; and they are paid, motivated and acculturated based on the value systems of their respective functions. Because of this conflict of interests, they may regularly be tempted to slough off team obligations in deference to functional ones. The project suffers; the team is discredited.

- Teams that succeed in isolation can be squashed by entrenched, old-guard power elites. A General Foods manufacturing unit in Topeka, Kan., did so well when it was tried in 1971 that it was never replicated elsewhere in the company, primarily because it undermined traditional labor-management relations. Lesson: Without powerful sponsors high up the food chain, even exemplary team experiments are highly perishable or likely to remain "experimental."
- Finally, some contrarians question the fundamental validity of the team concept. Harvard Business School Professor Abraham Zaleznik told *CIO* last October that teams "obscure accountability." Zaleznik believes managers "are scared to death of accountability. They're ducking it by forming task forces and working collaboratively." In short, teams undermine strong leadership by diluting, retarding and needlessly complicating organizational decision-making.

–Lew McCreary



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2 Technology Outsourcing

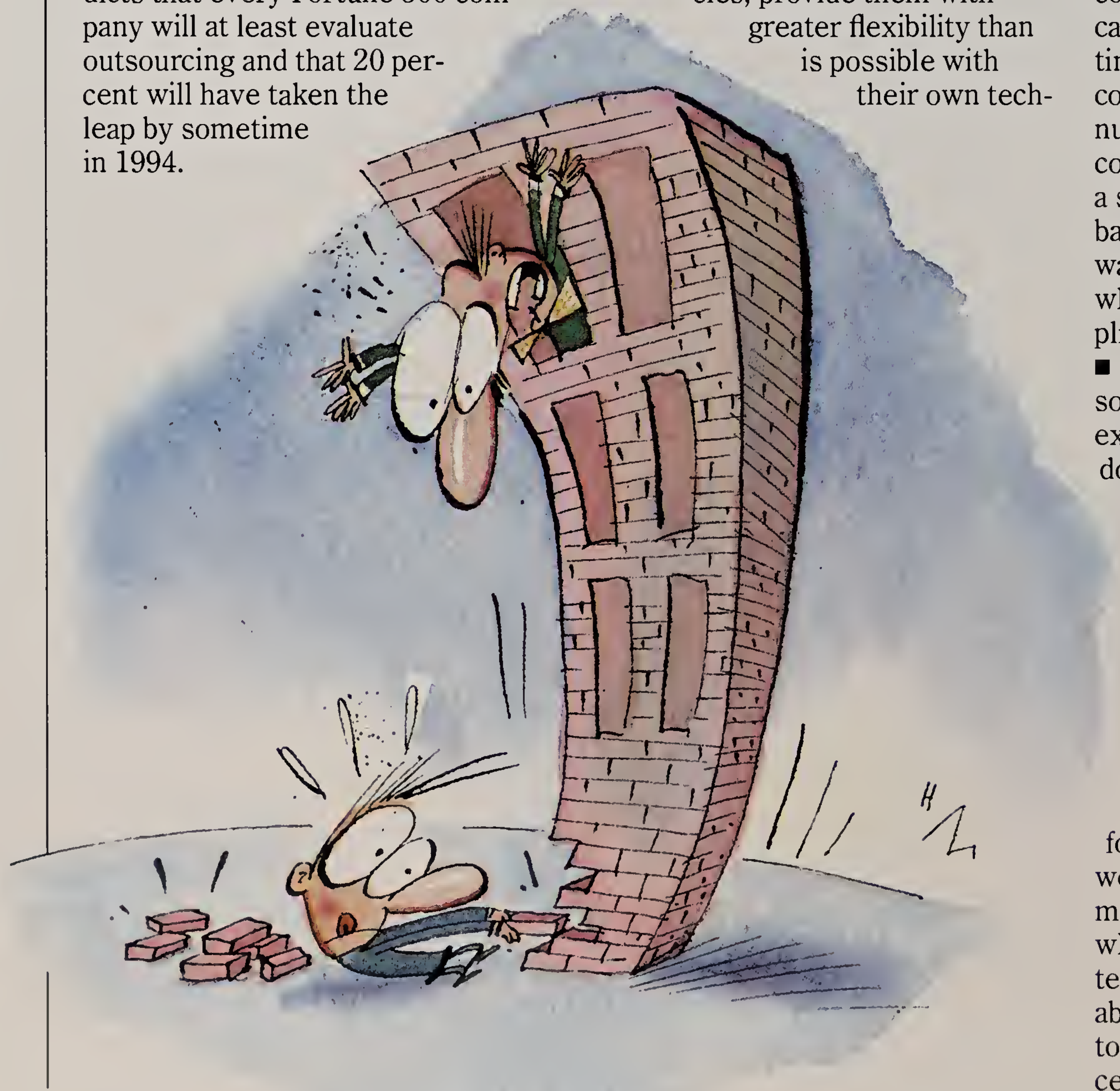
The trendline: Outsourcing—ceding all or part of the information systems (IS) function to a third-party vendor—is an obvious corollary of the business emphasis on core competencies. After all, if you are an H.J. Heinz Co. or a Southland Corp., it makes sense to concentrate your resources and expertise on making ketchup or selling Slurpees—not on running a data center, with all the costs and headaches that entails.

Although EDS Corp. was running data processing for Frito-Lay Inc. and Blue Cross & Blue Shield as far back as 1963, the trend really kicked in a few years ago when Eastman Kodak decided to outsource much of its IS operation. Now the deals are coming thick and fast: A recent report from the Yankee Group predicts that every Fortune 500 company will at least evaluate outsourcing and that 20 percent will have taken the leap by sometime in 1994.

Companies are contracting out everything from basic back-room functions to application development, systems integration and network management. But while many report considerable savings from such agreements, others are discovering the dangers of turning over hardware and software support to a vendor whose first priority is its own bottom line.

How it works: Companies contract with a third-party vendor to manage all or part of their information systems operations. This may involve anything from project management—the vendor is responsible for developing a new system or managing a network—to all hardware and software development and support—the "keys to the kingdom" approach.

What outsourcing promises: Successful outsourcing arrangements offer companies cost-efficiencies, provide them with greater flexibility than is possible with their own technology and personnel, eliminate the expense and headaches of operating an IS shop in-house, and allow them to concentrate on their core businesses.



The pitfalls: Risks are inherent in any operation that involves a relinquishing of control, and horror stories abound among outsourcing veterans.

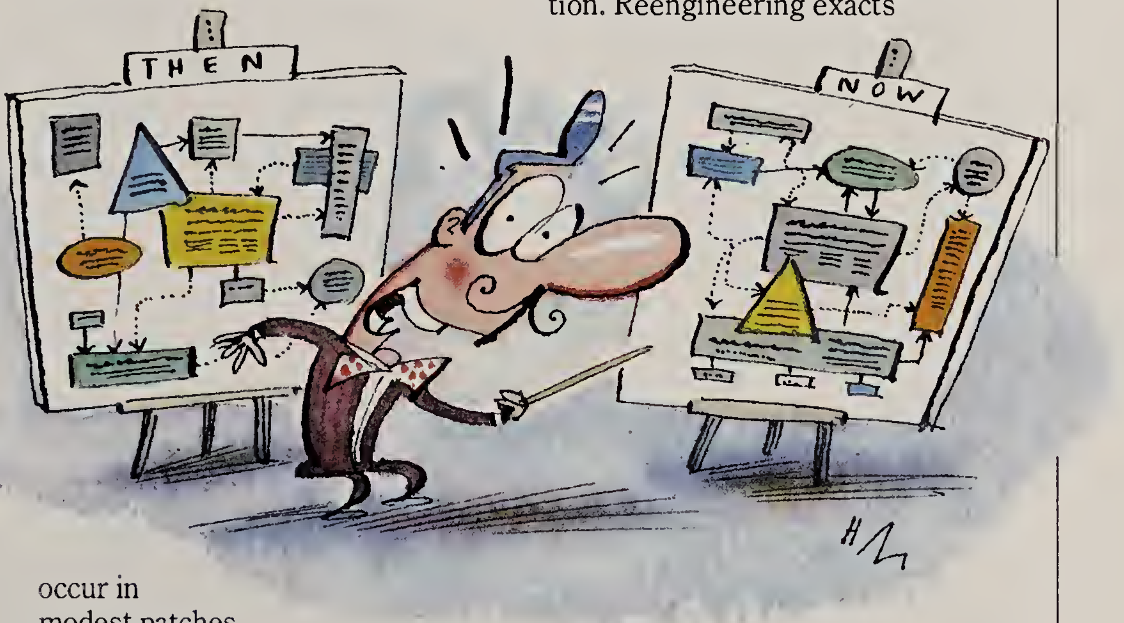
OUTSOURCING CAN BE EXTREMELY DEMORALIZING TO I.S. STAFF, WHO MAY END UP OUT OF A JOB OR FACING AN UNCERTAIN FUTURE WITH THE THIRD-PARTY VENDOR.

- Companies locked into long-term contracts may find their technology capabilities lagging while costs continue to rise. One bank-holding company was paying $11 million annually to a vendor that, over the course of several years, failed to get a single one of the company's 13 banks online with its chosen software and had no projections as to when that task would be accomplished.
- The only thing worse than an outsourcer that doesn't perform up to expectations is an outsourcer that doesn't perform at all. In rare cases, a vendor may decide to get out of the data-center business, allowing customer support to deteriorate or leaving clients high and dry, and without the technical resources to take the function back in-house.

Even if an outsourcer wants to continue service, sometimes it has no choice in the matter. "We found ourselves in a position where we had to move, literally with the marshals at the door," said a CIO whose outsourcer went bankrupt after being charged in some questionable dealings with another customer. "They had locked up the data center, and we got our lawyers to get them to open the door and let us pick up the tapes."

- Outsourcing contracts can be a mine field of potential disasters. If liability provisions are not spelled out, for example, a company may have no recourse if a programmer's mistake blows up a crucial billing system. Without a confidentiality agreement, the outsourcer might be tempted to abuse customer data. Termination clauses are especially crucial. "You want to be sure that you are not going to have to write some large checks to pull out equipment or get rid of your service," said J. William Anderson, senior vice president at Kidder, Peabody and Co. Inc. in New York, in a *CIO* interview last summer.
- Outsourcing can be extremely demoralizing to IS staff, who may end up out of a job or facing an uncertain future with the third-party vendor. The prospect is particularly unnerving for employees with mainframes-only resumes, while top people may jump ship early if they even hear that outsourcing is being considered.

–Leigh Buchanan



3 Process Reengineering

The trendline: By now, nobody in American business hasn't heard of reengineering. Its avatars of the moment, Michael Hammer and James Champy, have a book (with small-b bible aspirations) on the best-seller lists. And if you believe the hype from all of the ink reengineering has caused to be shed, it is the thing without which your business cannot survive much past next March. So get with it: Deconstruct your organizational processes the way a rigorous shrink deconstructs her patients' ids, egos and superegos. Then build a new, better, technology-powered organization that is fit for the rigors of modern competition. And don't wait, because your competition has already hired Hammer and Champy (or Andersen, McKinsey, Coopers, Ernst & Young, Deloitte or any of a thousand smaller but no-less-eager others) to help them do it.

How it works: As our author/consultants direct in their abovementioned book, *Reengineering the Corporation: A Manifesto for Business Revolution* (Harper Business, 1993), reengineering requires a "fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical, contemporary measures of performance, such as cost, quality, service and speed." Reengineering projects can occur in modest patches, intricately planned so as to be linked later into a comprehensive quilt of change, or else in large, overarching, scorched-earth campaigns that proceed swiftly, take no prisoners and leave behind wholesale new structures, systems, cultures, expectations—and an org chart that breaks the dispossessed hearts of the old guard.

What reengineering promises: In the end what you get is a company (or division or business unit or cross-functional process) that has removed the outmoded, time- and money-consuming, nonvalue-adding impediments (a.k.a. people, policies, activities and "white space") to consummating ideal, optimally profitable relationships with customers, distributors and suppliers. You get a new value system that places quality-driven customer satisfaction at the top of the goal pyramid and feeds on flexibility, quick response, nonhierarchical empowerment and an intimate understanding of customer needs and wants. Sure, in order to get the job done you'll spend a bundle—including a lot on new technology—but the whopping improvements in competitive capability will dwarf the costs. If nothing else, reengineering is, by definition, ambitious.

The pitfalls: It's hard enough for a single individual to change a bad habit. Consider, then, the complexity of changing an entire organization. Reengineering exacts big costs for its big ambitions. If you go (and most of you are going), do not travel light....

- Virtually every project is in some way understaffed or underfinanced. Management often fails to be realistic in allocating resources. In fact, a survey by Gateway, a New York management-consulting firm that promotes "rapid reengineering," concludes that two-thirds of its respondents do not even budget for reengineering. Team members often are not given the latitude to devote adequate time to reengineering projects—the Gateway survey estimates that half-time involvement is required for someone to make a "meaningful contribution." So don't be surprised when the well runs dry and the project is only 67 percent complete and badly behind schedule.

- Thus, it's not surprising to learn that most reengineering projects fail—at least as measured against management's front-end expectations. Even the leading lights of the reengineering consulting practices concede this. Champy's company, CSC Index Inc., surveyed reengineers and found a claimed success rate of less than one-third.
- Top executives wind the key in someone's back and then walk away. This dooms the project because, without the visible chest-thumping of a CEO, no one will believe he or she is actually required to do what's necessary to make the project work. In some cases, according to Ernst & Young Partner Michael Farabelli, CIOs are put in charge of reengineering efforts after being given only sketchy upper-level direction and no operable business plan. Those foolish enough to proceed under such circumstances flirt with the boardroom guillotine.
- Some even wonder whether reengineering doesn't simply substitute a new rigid structure for the old. Tom Peters, for one (see interview, Page 24), believes it's dangerous to cast an organization's design in stone—whether the stone is new or old. It is, he says, "absolutely antithetical to a marketplace where we don't know what's coming around the corner tomorrow afternoon."

–Lew McCreary

4 Total Quality Management

The trendline: Like family values and civic pride, total quality management (TQM) is a do-good ideology for our virtuous, anxious, global era. After all, who but a rogue (or a dolt) would argue that high-priced, low-quality goods and services are the surest path to market share? Certainly not American automakers—not anymore. With companies like Xerox Corp., AT&T and Milliken & Co. demonstrating the benefits that can accrue to those who run the quality race, TQM has become one of the hottest hymns in the management prayer book.

> WHO BUT A ROGUE (OR A DOLT) WOULD ARGUE THAT HIGH-PRICED, LOW-QUALITY GOODS AND SERVICES ARE THE SUREST PATH TO MARKET SHARE? CERTAINLY NOT AMERICAN AUTOMAKERS—NOT ANYMORE.

How it works: Customers, processes and numbers are the three sides of the quality triangle. Customers define quality, which is achieved by improving the processes for making and delivering products; numbers help managers measure the success of their attempts to improve the processes that improve quality. TQM is the application of quality methods throughout the company, based on the recognition that internal functions (such as information systems) have internal customers (such as finance or marketing).

What TQM promises: By substantially improving the quality of their products, companies can delight customers, achieve lower costs and perhaps even win the Malcolm Baldrige award.

The pitfalls: Companies have spent big dollars on programs to train employees in the latest quality practices, yet few organizations have gained substantial benefits in return. In fact, according to recent surveys by Arthur D. Little, the American Electronics Association, McKinsey & Co. Inc. and A.T. Kearney Inc., two out of three companies that grab for the quality brass ring fail to see much improvement in performance or customer satisfaction.

Failure in the TQM arena can be achieved in many ways.

- Some companies launch too many quality activities at once, says Quality Consultant Robert Schaffer. One large company—a quality model—had nearly 50 quality initiatives ping-ponging whithin it at once, making it impossible for managers to know which measured improvements were attributable to which programs, or if other factors had caused the upticks.
- Even companies that can evaluate their quality programs often don't, reports the American Quality Foundation. Or the strategic focus of their quality programs is askew: They don't take into account intelligence on competitors, nor are their programs built around a focus gleaned by research on customers.
- Benchmarking one's processes against those of other companies is part of any good quality plan. But it is easy to do benchmarking wrong—to pick processes that are too broad or too narrow, for instance, or to become distracted by details. Nor is it for the innocent: Some benchmarkees gather competitive intelligence on benchmarkers, we were told by Ernst & Young consultant Rick Swanborg.
- Companies sometimes embark on TQM programs to improve their performance, but quality is no guarantee of corporate success. Wallace Co., a Houston-based pipes and valves manufacturer, won the Baldrige award in 1990 and dropped

into the red just months later, in part because it spent so heavily on quality, sources close to the company say. (Wallace was acquired just over a year ago by Wilson Industries Inc.) Both Federal Express and Xerox suffered profit slumps (for business reasons) after winning the award.

Finally, the tide may be turning on TQM. The number of contenders for the Baldrige award has fallen off dramatically. And *Fortune* reports that TQM disasters have spawned a new niche for consultants who specialize in cleaning up the mess.

–Thomas Kiely

5 Systems Downsizing

The trendline: Like corporate downsizing, in which a company closes facilities and gets rid of assets and people to make it through hard times, systems downsizing is seen as a way to trim fat and become more responsive. It's a recent phenomenon (six years ago it was difficult to find a company that was doing it), made possible by tremendous advances in computer hardware. However, application software has lagged, and pieces of the new environment may not naturally coexist. Most successful downsizing projects involve information systems executives who have applied their ingenuity and resourcefulness to build their own systems and devise means to link and manage all the disparate pieces of the new, heterogeneous environment.

How it works: Companies move some or all of their applications off their big iron (mainframes, minicomputers) onto smaller, cheaper, faster machines (usually workstations or PCs that are networked together, often in a multiplatform environment).

What downsizing promises: There are three basic reasons to downsize: cost savings; increased functionality, speed and flexibility for users; and vendor independence.

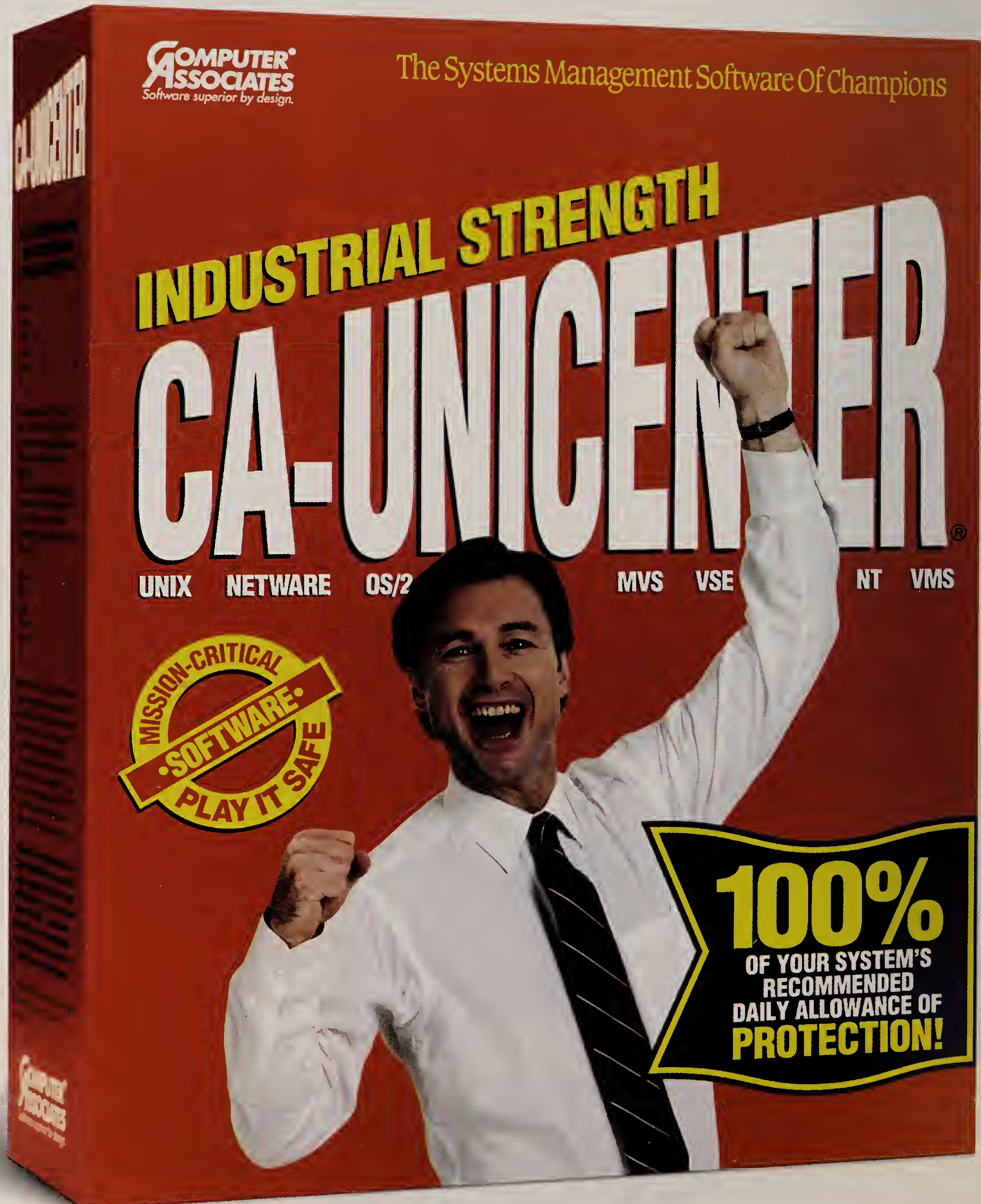
The pitfalls: The costs of moving to a downsized platform can be formidable, depending on the complexity of the environment being built. Retraining is especially costly.

- Downsizing usually involves networked systems, and many IS shops lack network-management expertise. Vendors are just beginning to offer tools that can adequately handle network-management problems. Also, security, backup and software distribution are all much more difficult to control in a downsized, networked environment.

- Existing servers simply don't pack enough power for large companies with high-volume, business-critical applications. This situation is improving with advances in new kinds of computers, but some companies swear they'll never move certain applications off the mainframe.
- As recently as a year ago, there were almost no good client/server software packages or development tools available. This too is changing, with vendors announcing new releases all the time. Still, a large number of applications must be converted or written from scratch.
- Integrating multiplatform processors is difficult. Vendor independence gives companies more options, but it also places squarely on their shoulders the responsibility of selecting, buying, linking and jury-rigging a formidable array of technology components. There are still no standards for doing this.
- ROI is a bear to pin down, and if transition costs get out of hand—which they often do—it could be some time before the savings are there.
- Some IS personnel either can't or won't learn the new technology, and a not-inconsequential portion of the staff will likely leave. Those who stay will require a lot of retraining. These and other nontechnical costs, including reengineering work processes, "can dwarf the costs of the systems," Allan Levy, vice president of technology services at downsizing consultancy International Systems Services Corp. in Stamford, Conn., told us last year.
- Depending on the corporate culture, there may be power struggles among managers who feel threatened by the new, more "democratic" environment.
- If flexibility is not adequately built into the architecture, systems created one year can become a liability the next, when conditions change.

–Abbie Lundberg

How To Fortify Against
Other Systems Mana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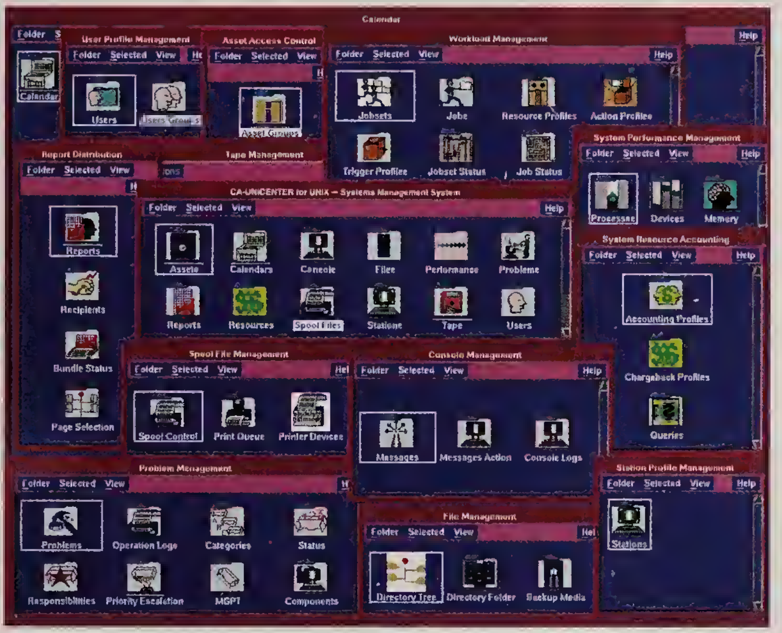

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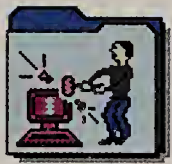
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A MEASURED SUCCESS

Determining technology's contribution to a company's health and well-being is an important part of the chief executive's job. Old hands at the measurement game agree: Indicators must go beyond cost and relate to the firm's business goals.

BY RICHARD PASTORE

Eighty-five measurements feed the FirstLine Trust appetite for overall performance evaluation, and still the mortgage banker is hungry for more. "We measure everything; it's the heart of our management-by-objectives program," says Brendan Calder, president at the Toronto-based company. It's also the best way Calder knows to take the pulse of information technology (IT), an increasingly indispensable part of a CEO's responsibility—and one that can precipitate doubt in the most self-assured executive.

All FirstLine metrics are strictly business-based, including the set that applies to IT. "We only measure the ends, not the means," says Calder, who couldn't care less how many MIPS the systems churn out but who keeps monthly tabs on business yardsticks like IT's cost per number of mortgages serviced.

Calder spearheaded the notion of IT as a strategic advantage at FirstLine. He also elevated the division's director, Janet Wilson, to the top-executive plateau. With information systems (IS) his foster child, he's not exactly eyeing it with cold suspicion. "But I'm no technocrat," he says, noting that he's not always satisfied with IT's marks. So he's not taking any chances of being bamboozled by arcane lingo and funny budgeting. Indeed, IT squirms under the same magnifying lens as any of FirstLine's mortgage-servicing operations.

Much of Calder's overall IT evaluation is cost-based—things like cost per employee and cost as a percentage of revenue. "It's not fashionable just to think of cost; that's why we're looking for more ways to measure the usefulness of IT outputs."

In evaluating department and individual staff performance, however, he does rely heavily on noncost metrics. User satisfaction with IS deliverables,

SUBJECT

FirstLine Trust, Toronto
Industry: Mortgage banking
Revenue: $5 billion (Canadian) in assets under administration ($3.75 billion U.S.)
Total employees: 220
IS staff: 25
Executive: Brendan Calder, president

OBJECTIVES

- **Use technology to compress mortgage cycle and facilitate delivery to customer**
- **Support IS in this objective while controlling costs**
- **Evaluate IS contribution to business value and division performance within context of management-by-objectives program**

CONCERNS

- **What methods can we choose to better gauge usefulness of IT outputs?**
- **What leading indicators can help measure where IS should be in three years?**
- **How can we leverage benchmarking in IT evaluations?**
- **Should we adjust our evaluation**

PHOTO BY PETER TANG

BRENDAN CALDER: *"We're looking for more ways to measure the usefulness of IT."*

surveyed semiannually, accounts for 25 percent of this evaluation. FirstLine also mandates and measures technical innovation. About 20 percent hinges on IS's ability to implement three systems each year not in the original plan and to introduce strategic and technology options that win user acceptance. Another 40 percent rides on IS's success in meeting prestated systems objectives. The rest applies to auditability and other cost metrics.

Aided by a small, flat executive structure, the president takes an active role in all forms of evaluation. Calder and his partners visit other mortgage-specialty banks, sizing up their IT efforts. He meets weekly with Wilson and the top staff, making performance accountability "worse than immediate." He and Wilson also meet three times a year to review her performance and that of the department.

Despite his umpteen metrics, Calder knows there's more to it all. He's concerned about his emphasis on cost metrics and whether the evaluation weights are appropriate. But mostly he wants to know what else he can do to make his evaluation more useful, if not more thorough.

emphasis and weighting?

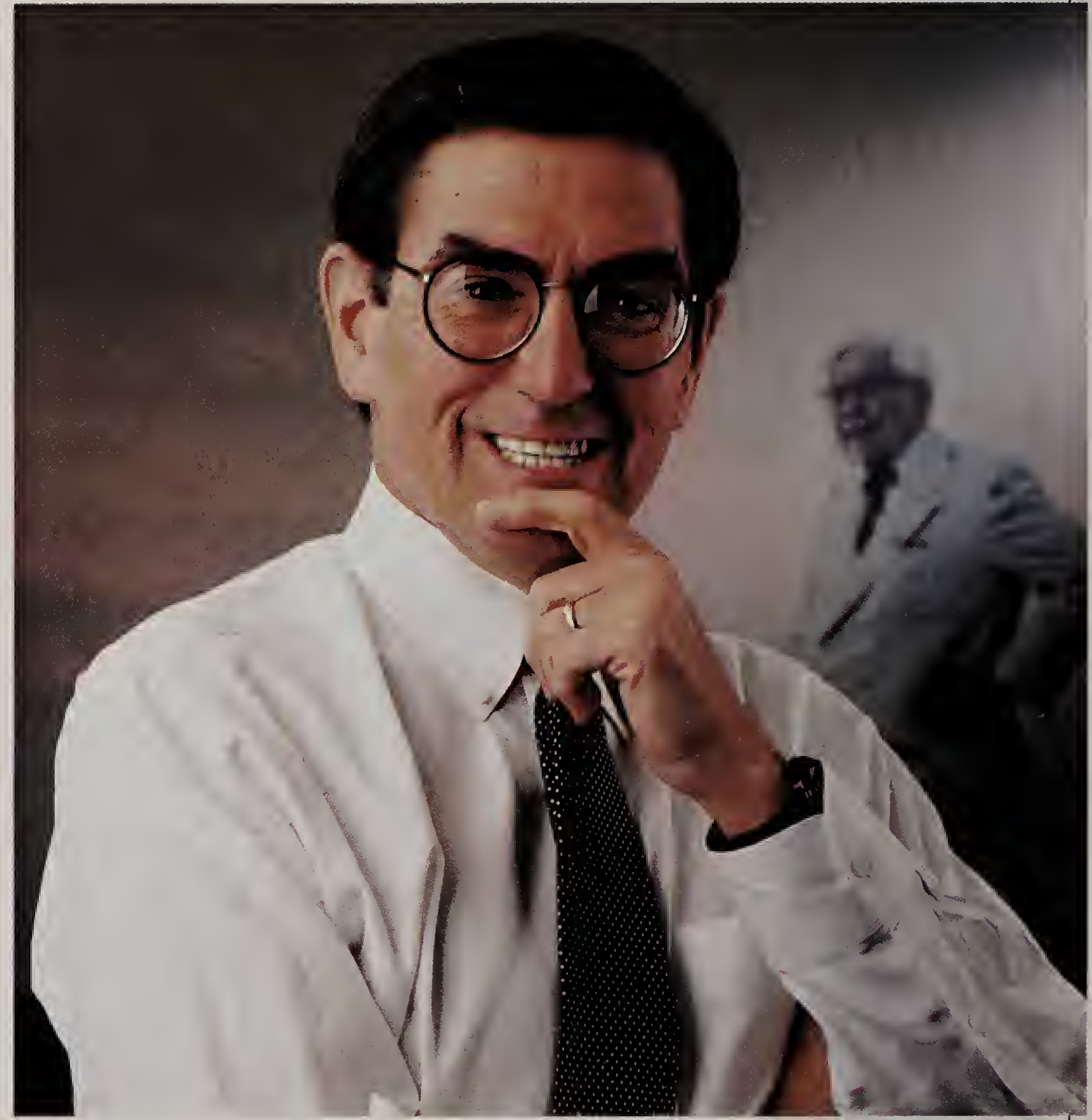
- **Should we link our evaluations with end-customer satisfaction?**

JOHN CRANOR
KFC Corp.

EDWARD J. MOONEY
Nalco Chemical Co.

ERIC L. STEENBURGH
Ricoh Corp.

KENT "OZ" NELSON
United Parcel Service of America Inc.



JOHN CRANOR: *"With technology, what counts are human results in the marketplace."*

John Cranor, *president and CEO, KFC Corp., Louisville, Ky.*

You and I seem to share the same ambition for information technology, Mr. Calder, even though I work in an industry where many think the spatula is the ultimate technology innovation. It's true that for decades, fast-food restaurants have basically been little food factories. Most of the attention was devoted to cooking the meals in the back of the restaurant rather than to serving the customer.

Now we have systems that can predict customer demand, schedule labor and even order inventory. This improves our operating economics, but it also gives our associates more time to serve customers. I'm counting on this technology to help KFC set up shop in new places like airports, campuses, zoos and supermarkets—taking our product to consumers instead of waiting for them to come to us.

I'm impressed by the prominence you have given IT, and by the integral role that technology seems to play in achieving FirstLine Trust's strategic objectives. I also like the idea of having the IT chief on the top-management team. Actually, organization boxes and reporting requirements aren't important to me. What's important is that technology people possess real business operating experience. When my technology guru hears the word "byte," I want him to think Original Recipe chicken, not computer memory.

We've got a great IS chief named Ken Harris, who did an excellent job operating restaurants at Taco Bell Corp. before we convinced him to join us. Ken believes you can't just evaluate technology's impact by looking at costs, and I agree. I'd advise you to look at two other criteria that are equally or even more important—the impact on product quality and sales opportunity.

To use KFC as an example, one of our goals is to use technology to reduce our labor costs by about one point per year—a tidy $15 million in annual savings. But we also know that better inventory projections have an impact on food quality and preparation, allowing us to continually improve the serving temperature and moistness of our chicken. Another technology that doesn't immediately affect cost are the systems that collect and disseminate information on our most-frequent customers. If we can get names and addresses of our most-loyal fans, we can bypass traditional TV advertising and communicate directly with these customers, giving coupons and other incentives to convince them to come to KFC more often.

As you indicate, setting technology goals is one thing; knowing that technology is helping achieve strategic business goals is something else. For instance, KFC has market managers who are responsible for running 10 to 20 restaurants each. A couple of years ago, we decided to invest in laptop computers that would give each market manager a daily snapshot of his or her restaurants' business performance. The intent was to save them time and give them the freedom to quickly note those restaurants that were working well and focus on the trouble spots.

The technology people went crazy, preloading the laptops with software that could calculate everything from daily sales to the exact number of coleslaw containers left in the storeroom each night. There was just one problem. The market managers didn't want or need to know the exact quantity of inventory items. So they stuck the laptops in a corner. From a technology standpoint, the computers were meeting every objective. From a reality standpoint, the technology wasn't performing.

Back at the drawing board, we got our market managers really involved in the details, and today laptops are as much a part of KFC as mashed potatoes. Keep in mind the lesson every CEO learns: With technology, what counts are human results in the marketplace. To use one of my

PHOTO BY ROBERT HOWER

favorite quotes from an anonymous Englishman: "If you think technology alone will change organizational behavior, you're either a liar or a management consultant, or both."

Edward J. Mooney, *president and COO, Nalco Chemical Co., Naperville, Ill.*

To begin with, I think you have several good objectives for your information systems department, Mr. Calder. They are customer-focused, and you evaluate IS based on business value. However, I'd like to offer some observations.

Metrics are critical to managing any business and spotting both positive and negative trends. However, all metrics must be relevant. I define relevant both as an indicator of business success and as something that generates action if a negative trend develops. While I'm not sure how many indicators you use to gauge IS performance, 85 overall metrics may be too large a number to track effectively on a regular basis. In the IS area, I suggest focusing on those metrics that relate to customer satisfaction and quality of service, as well as basic cost measurements.

Satisfying the customer became Nalco's defining mission in the late 1980s. To support this mission, we deployed information technology at the point of sale—specifically, laptop computers for our sales force. Through surveys and measurement, we found that these systems made a significant impact on customer satisfaction and business retention, for which we were honored this year with a Partners in Leadership Award from the Society for Information Management [see "Joint Ventures," *CIO,* Sept. 15, 1993].

Gauging the benefits of investment in IS is difficult for everyone. Along with the standard ROI measurements, you might try surveying your customers whenever an IS project affects them directly. This will tell you if you're focusing technology on what's important to your customers. It may also give you an idea of the payback in how much additional business was generated.

I feel strongly that departmental and individual performance measurement and incentives should be clearly linked with business performance. I recommend basing some portion of management and individual compensation on company success. This helps motivate employees to focus on and champion projects with a good business payback.

One last point on performance measurements: It's important to ensure that metrics for a department do not conflict with metrics for individuals in the department. As an example, it may be difficult to foster individual innovation in a department if the department head is evaluated only on a cost basis.

I commend your placing your CIO at the executive level, but keep in mind that regular interaction with her peers as well as yourself is important to her developing a first-hand understanding of the business. Including her in the development of your overall strategic plan will help ensure that IS supports your strategic business goals. And take her with you when you visit other mortgage companies on benchmarking studies.

Benchmarking is a crucial activity in this time of constant, rapid change. I'd use several methods. First, seek out performance statistics from industry consultants or trade publications on world-class competitors in your business. Setting goals based on world-class standards should surface some additional areas where technology can help the business. I'd also look to top performers in other industries where a unique application of technology has led to a clear business advantage.

In your listed concerns, you wonder how to determine where IS should be in three years. A better question might be, "Where should FirstLine Trust be in three years, and how can IS help?" To properly answer this, everyone must share some common goals and be motivated to work as a team to achieve them.

I hope my suggestions help, Mr.

Panelists' Findings

- **Cost-based evaluations may overlook unquantifiable or long-term IT benefits.**
- **IT-performance metrics are relevant only if they are indicators of business success and can generate action if a negative trend develops.**
- **External and internal customer satisfaction are the most-important IT evaluation criteria.**
- **Technology's effects on product/service quality and sales opportunity should also weigh heavily in evaluations.**
- **Talking to users and customers can reveal whether seemingly successful technology is really achieving strategic goals.**
- **Who reports to whom is not as important to IT performance as is the technologist's understanding of business operations.**
- **Placing the IS chief on the strategic policy committee can help facilitate evaluation-related communications with senior officers.**
- **IS departmental and individual performance measurement and incentives should be clearly tied to business performance.**
- **Define IT deliverables as business goals and hold users and IS financially accountable for their successful delivery.**
- **Benchmark with world-class competitors and top performers in other industries to find areas for improvement.**

ERIC STEENBURGH: *"I want to see benefits achieved before we reinvest in other projects."*

PHOTO BY PETER VIDOR

Calder. We certainly struggle with many of the same issues. If applied properly, IT can enable you to move out in front of your competition. But it can just as easily soak up resources with little or no payback. That's why IS cannot be viewed as a separate function with a separate plan but must be used as a partner in attaining business objectives.

Eric L. Steenburgh, *president and COO, Ricoh Corp. USA, West Caldwell, N.J.*

I applaud management by fact, Mr. Calder, where you take a lot of the emotion out of it. Personally, I couldn't deal with 85 measurements, but that number may be appropriate for a financial-services business like yours. The foundation of my evaluation technique is to define IS deliverables as business goals and enforce performance promises with financial accountability. We haven't broken everything down into individual metrics.

We're similar in that we have small senior-management structures; you've got six or seven top managers on your strategic committee, and we've got a dozen senior executives on our policy committee. That helps us get our arms around the whole issue of technology performance and evaluation. Like you, I also placed my information chief, [Vice President of Management Information Systems] Joseph Vallorosi, on the committee, so he's there from the beginning, when business objectives are being identified.

If IS or the user departments promise me some big savings or improvement [as the result of a new system], I expect to see the change show up on their ledgers. I want to see that benefit be achieved before we reinvest in other projects. I'll actually deduct projected savings from the business unit's proposed budget for the next fiscal period, so they'd better deliver. If not, they'll be penalized by losing some of their bonus. The same thing goes for the IS department. For example, they had some difficulties matching a new system to user requirements and delivering it on schedule. The technical people lost 25 percent of their bonus for that period.

Obviously cost is a big part of my evaluation, as it is yours. Our recent six-month report showed that the $600,000 we spent on completing IS projects will return $400,000 in gross profit and process improvement per month, or $2.4 million in the next half-year.

But other things are harder to quantify and can be missed by cost-focused measurements. We're near the end of spending $8 million to migrate from three computer systems to one. That decision doesn't show a short-term payback, but we knew it was the right thing to do because it would be a strategic enabler for other things that will pay off—business-process improvements and elimination of redundancies. You have to be careful that your measurements are flexible enough to take these eventual payoffs into account.

User satisfaction and IS quality are other areas where mathematical metrics aren't much help. I understand you survey internal IS customers, but you might consider setting up a user committee like we've done. Our systems-management committee has the top senior executive from each operating business unit. That's where we get our satisfaction results and a lot of our quality measurements.

You seem to be giving reasonable weights to your noncost measurement categories. Factoring in end customers will be tricky for you, though. We provide our dealers with computers that let them tie directly into our systems, and we survey their satisfaction. A mortgagee's satisfaction would be harder to tie directly to IS, unless you let applicants check their mortgage status by PC, for instance.

I was involved with benchmarking when I was with Xerox Corp., and it's something we're doing more of here. We don't have a complete set of IS benchmarks yet, but I want to do that. In one sense, we are benchmarking systems. We wanted to add a credit-card billing system for small end-user purchasers. IS was going to build that system, but I said, "No, the card companies are better at that, so let's buy a turnkey system from them." We implemented a benchmarked system from someone else. IS doesn't have to do everything itself just because it's a technical challenge.

KENT NELSON: *"Numbers and studies don't always tell the story."*

PHOTO BY ANN STATTS | SABA PRESS PHOTOS

Kent "Oz" Nelson, *chairman and CEO, United Parcel Service of America Inc., Atlanta*

For me, evaluation of IT has several key elements: I look hardest at customer and user satisfaction, then employ long-term, five-year profitability and benefit studies, receive input from members of our steering and management committees, and use peer and industry feedback to help benchmark our progress. All the while, I consult closely with Frank Erbrick, our senior vice president of information services, to gauge project successes.

At UPS, IS now has 4,000 team members and is supported by a five-year, $2 billion investment. It is integral to everything we do, enabling us to deliver to our customers information as well as packages. Mr. Calder, while I may not fully understand the intricacies of mortgage banking and can only guess at the returns you need from your IT investment, I can share with you what's worked for me. Essentially, if we can't satisfy users, then rigid methodologies and metrics lose their importance.

First, some background. When we modernized UPS, we recognized that the responsibility for automation and technology improvements lay with our business functions, not with IS. The technology group made innovation possible, but the decisions were user-driven, user-supported and, for the most part, user-implemented. Since then, we have put into place a strong network of user representatives who advise us on IT applications in their specific functional areas.

In tracking technology projects from their earliest stages to maturity, we first talk to the users to find out what their needs are. The next step is defining specific objectives and formulating a plan that outlines each business function's contribution toward the greater goal. We then perform a five-year costs-and-benefits analysis that estimates the resources involved in our project. We keep going back to this analysis to measure our progress.

From there, we prototype the technology, consulting users every step of the way. Designers fine-tune the technology based on users' suggestions and then introduce the product companywide.

To illustrate, take a look at our Delivery Information Acquisition Device (DIAD) project. The DIAD is the handheld computer our drivers use to record delivery information. Although our drivers were receptive to new efficiencies, many of them knew nothing about operating a computer. So we made a prototype and tested it for 18 months in the field before it was mass-produced. Focus meetings were held with drivers to get their views, and major design changes were made as a result of this input.

In addition to driver recommendations, UPS also employed automated performance-testing tools—unit testing, system testing, function points and defect tracking—but we kept user satisfaction as the paramount metric.

When deployment was imminent, a training package consisting of classroom and on-the-job instruction, as well as home study, was applied to ensure that all drivers received the time needed to become familiar with the device. Following the rollout, we went back to our drivers and asked if the DIAD had achieved its intended purpose. The answer was a resounding yes.

In short, numbers and studies don't always tell the story, Mr. Calder. Talk to your customers and users to confirm that your IT investment is well worth it.

EDITOR'S NOTE

"Second Opinions" takes real-life issues facing real-life information executives and presents them to a panel of experts—IS practitioners, consultants, academicians and non-IS executives—for evaluation and advice. While our revolving panel of experts cannot explore all the possible solutions in this limited space, we hope that by suggesting a few strategies, they may contribute to a better understanding of serious, common concerns of IS executives and other business leaders. We also plan to check back with our subjects to see how they chose to address the issue and to report on their progress.

We invite our readers to offer topic suggestions and/or serve as case studies for future articles. Please contact Richard Pastore at 508 935-4435.

CROSSING *the* LINE

What happens when a line manager takes charge of information systems, or an IS manager assumes a prominent business-unit position? At Mattel and Brooklyn Union Gas, such crossovers initially resulted in culture shock for both the managers and their new staffs. But once these transplants settled in and gained the trust of employees, the cross-pollination of talent made their functions newly rich in business knowledge and technology expertise.

BY THOMAS KIELY

Taking the Technology Reins

The adage, "Those who can, do; those who can't, become critics" doesn't apply at Mattel Inc. There, one of the loudest critics of the company's information systems function ended up running the shop—with considerable success.

Four years ago, as vice president and controller in the operations division of toy manufacturer Mattel, based in El Segundo, Calif., John Phippen was an outspoken critic of the company's IS managers. "I said I could do the job just as well, if not better than the incumbent [CIO]," Phippen recalls. The company's top officers decided to take him at his word and asked Phippen to trade in his finance hat.

Technology was adrift at Mattel in the late 1980s, and Phippen wasn't the lone critic of IS. "Our technology people didn't know or understand customers," explains Jim Eskridge, executive vice president and CFO. "We wasted millions of dollars to make ivory-tower systems that didn't work."

Case in point: Mattel's technologists, convinced they could develop a sophisticated in-house telecommunications network, ran into technical hurdles and ended up delivering a system composed of hybrid equipment. As a result, several Mattel sites could not trade information with headquarters or with one another. Worse, because IS hadn't bothered to assess customer needs, it eventually delivered too much net-

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How To Succeed in Business

An information systems executive who takes over a critical business function needs the versatility of Bo Jackson, particularly when he is faced with a major reengineering project and a staff suspicious of his technology pedigree.

That is the situation in which Bill Feraudo found himself. Feraudo, vice president of the customer-assistance division at Brooklyn Union Gas Co., in New York, spearheaded a massive reengineering project that will affect one-third of the company's employees and the utility's critical interaction with customers. Feraudo relies heavily on the company's existing customer-service systems and needs many new systems to complete his reorganization project (it includes a merger with the marketing department). He'll get what he needs: Until just over two years ago, Feraudo was one of the company's top IS executives.

In fact, Feraudo built the company's customer-related information system (CRIS) just before he moved into his current position. (See "Brooklyn Gas's Main Event," *CIO*, Oct. 1, 1991.) "He built it," says Craig Matthews, executive vice president and CFO (and Feraudo's boss). "So now he can put it to the test."

Matthews says he gave the line job to Feraudo because "Bill has demonstrated his ability to get change and new products imple-

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ILLUSTRATION BY GREG COUCH

Taking the Technology Reins

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work capacity to some company sites and too little to others. On another occasion, IS "delivered a turnkey system to an international affiliate that was garbage," says Lindsey Williams, president of Mattel International.

Eskridge, who had just joined the company, knew he had to get IS into shape, fast. While he would have preferred to knight as his IS chief a manager who knew both Mattel's business and the technologies it would need to stay competitive, he felt that such a hybrid didn't exist. Another technology manager was out of the question. "I wanted to send a message to IS," Eskridge says: Phippen was Mr. Fix-It.

So Phippen was installed as director of the company's financial systems. The incumbent CIO retained responsibility for other systems—at least initially. Predictably, Phippen and the discredited IS head clashed, and the CIO quickly retired, handing Phippen the keys to the entire shop.

But why did Eskridge pick Phippen? Eskridge says the former finance manager is "a good businessman. He knows Mattel, the toy business and the customers—that was critical." Phippen would be able to comprehend the business issues implicit in the systems that Mattel's operating leaders would need.

Eskridge was counting on Phippen to convey that business-minded focus to the technologists in IS. Phippen, says Eskridge, is "a good motivator." As for knowing the technical issues upon which IS lives or dies—Eskridge figured Phippen to be a fast learner.

> **"People were apprehensive when I came into IS. Some of them had good reason to be apprehensive."**
>
> *–John Phippen*

A technical babe-in-the-woods calling the shots for a crew of IS hotshots with a nearly $35 million budget? IS got Eskridge's message, and many were aghast. Phippen-the-critic was now Phippen-the-king, and some heads rolled. "People were apprehensive when I came into IS," Phippen admits. "Some of them had good reason to be apprehensive." With the turnovers behind him, Phippen claims his organization is now "pretty upbeat."

Phippen's management style is team-oriented and customer-focused. He has moved some of his technical staff to business locations, and would even like them to attend business-function staff meetings. Jeff Douglas, Mattel's vice president of logistics, says that the IS people assigned to his area feel like part of the business staff. Phippen has also launched a quality push within his organization and is working to reduce application-development cycles. He insists that customers—not IS staff—take ownership of projects.

Jim Senechal, Mattel's senior director of advanced technology, says it quickly became apparent that a new order was in place. "With his user's view of IS, John pushed us to look at [technology] from a business perspective," Senechal says. Phippen has also raised the credibility of IS within the organization, and he has the attention and the backing of Mattel's top management. (As of this writing, Mattel is completing its acquisition of toy company Fisher-Price. When done, Eskridge will become president of the Fisher-Price division, and Phippen will report directly to Mattel chairman and CEO John Amerman.)

As for the business of IS, Phippen is earning his stripes. He has nearly completed implementation of a new telecommunications system—primarily in partnership with AT&T—to replace the unworkable IS-fabricated hodgepodge. The project is "on time and under budget," says Williams—and is exactly what customers need.

Under Phippen's direction, IS is also rolling out a global marketing system—something the former CIO had attempted but failed to create. Moreover, the new IS chief is pursuing technologies that are strategic to the business, including sophisticated 3-D CAD/CAM systems for developing products and EDI links with customers. And he oversaw the building of a logistics system, with which Douglas is delighted.

Despite Phippen's achievements, concern lingers about the depth of his understanding of technology. "Technology keeps changing," Douglas notes, "and John will have to stay on top of that." Senechal says that Phippen has a general grasp of technology, "but when we get to the detail level—that's tough to communicate."

Even Phippen worries about his lack of expertise in this expertise-besotted function. "If product information is honest and straightforward, I can understand the technical issues," he says. "But if people misrepresent their products, I have to depend upon technical people."

Still, Williams and Douglas want Phippen to stay right where he is. Douglas notes that Phippen still needs to hone the IS organization to embody the new values fully.

Some IS staff members are worried that Phippen's success bodes ill for managers within the function who can balance business with technology. Eskridge, they believe, can now only envision putting a general manager in charge of IS. The grumbling seems to indicate that IS still hasn't gotten the message. Eskridge says the lesson should be that managers seeking top spots at Mattel need to demonstrate their business acumen first and foremost, regardless of the function they grow up in. "There's no reason why a good businessperson can't travel to another area," Eskridge says.

How To Succeed in Business

Continued from page 47

mented." Feraudo, who joined the company's IS department in the early 1970s, became an engineering business manager in 1981 and managed the building of a new corporate headquarters. In 1987 the company's old customer-service system died, and Feraudo returned to IS to lead efforts to build a new one. "With both the CRIS system and the building of the new headquarters, Bill got the jobs done on time and under budget," Matthews says. "He makes change happen."

Feraudo's technical expertise will prove critical to the reengineering project, Matthews explains. Much of the change about to be visited upon the company's customer-service organization will involve technology—including new meters, meter-reading equipment and massive software applications that will be leveraged off the CRIS system. Feraudo knows his way around that neck of the woods.

Feraudo decided to learn by experience: He started going out on service calls and meter-reading expeditions with the company's front-line, unionized troops.

Customer-service employees weren't thrilled with the appointment. "A lot of people said, 'This won't work; he's a technology guy, not a customer-service guy,' " recalls Victor Courtien, general manager of customer inquiry and account services. "And Bill struggled when he first came over here."

Courtien and others say that Feraudo seemed "awkward" in his new environment. "He wasn't sure how to approach people. He was quiet. He didn't know what to do or say," according to Courtien.

Feraudo decided to learn by experience: He started going out on service calls and meter-reading expeditions with the company's front-line, unionized troops. He even convinced the company's top officers to do the same. (On one of their excursions, the COO was bitten by a dog and the CFO was infested with fleas.)

"It was eye-opening," says Matthews. "And it was the right thing to do. It was a way to get close to the territory, to get an idea of the range of problems that our people face and to recognize that problems aren't all black and white."

At the same time, Feraudo gave his managers the authority to make their own decisions (in this way distinguishing himself from his predecessor). His personality also helped to win the allegiance of his new employees: Feraudo is an extremely enthusiastic, energetic man, and that enthusiasm can be infectious. "He's one of us now," says Courtien.

"Bill created a bridge between us and IS," says General Manager Robert Moore. "IS knows a lot more about our business because of him, and we're learning a lot about technology. I mean, we're talking about object-oriented programming over here—can you imagine that?"

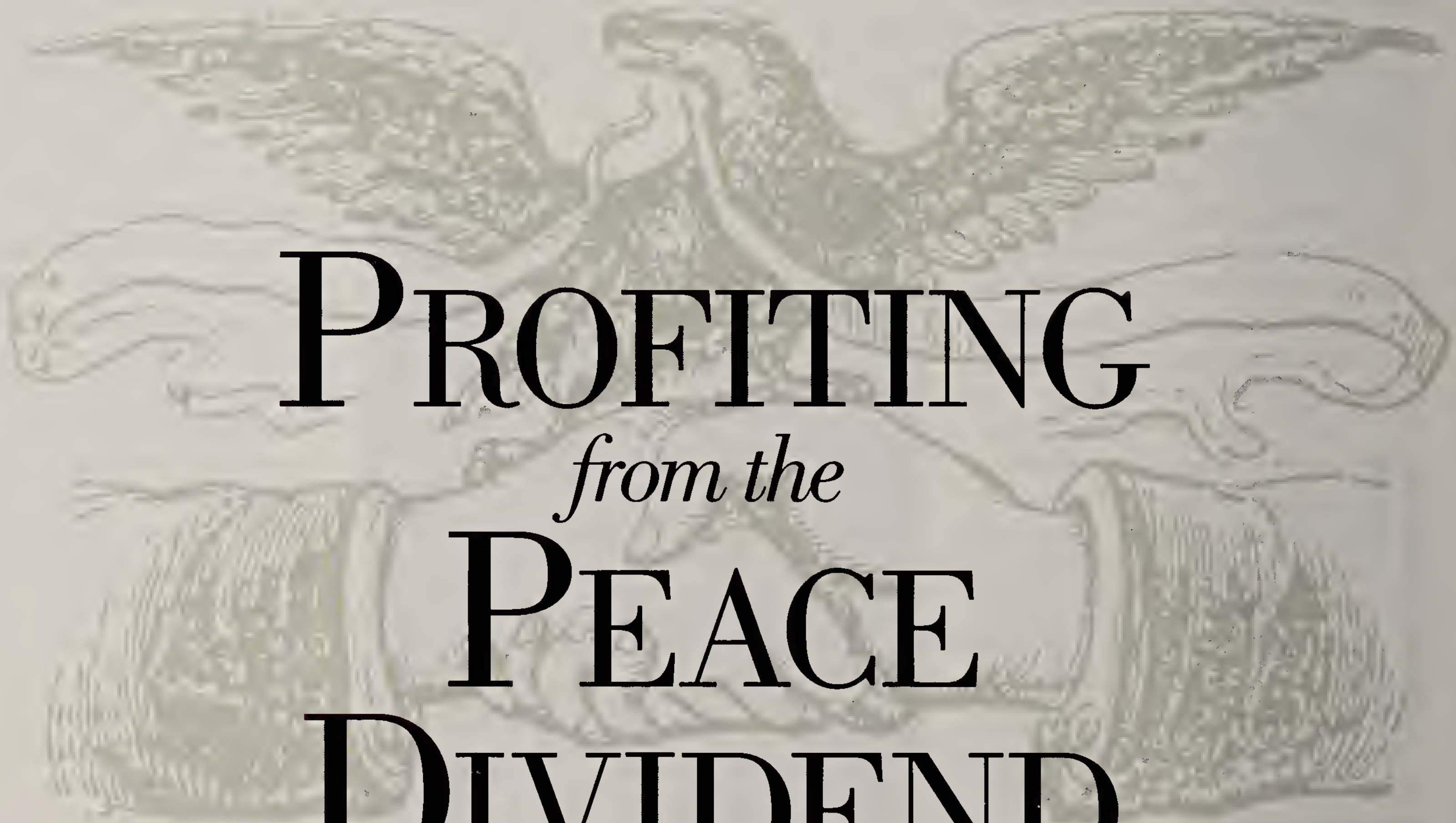
Better still, says Moore, Feraudo knows how to get what he wants out of the company's technology folks. The former application-development chief knows all the excuses, knows the real reasons behind delays, knows costs and knows the people. A superuser, as it were, Feraudo knows more about the way IS operates than any other line manager in the company, and he could use that knowledge to get more than his fair share of the IS pie—if Vice President of Information Services Tina Barber let him.

"He's one tough customer," says Barber. "But I've been in information systems a long time, and I have my own power base." (Barber ran the data center and telecommunications operations while Feraudo ran application development; now she has the whole IS taco on her plate.) Barber acknowledges that Feraudo probably held the stronger bargaining position when their transitions first occurred. "But I've gone up the learning curve," she says. (Every manager interviewed for this article noted that line managers in other functions have sometimes approached Feraudo for second opinions on IS matters. But Feraudo discourages it, and such instances are now rare.)

Barber adds that her relationship with Feraudo is terrific (Feraudo concurs) and that the two sometimes use their combined clout to expedite matters for IS, obtaining funds from the reengineering kitty to seed IS support projects, for example. Barber, who describes herself as more of a "technical person than Bill is," also has her own goals for IS, including a transition from mainframe applications to distributed client/server business systems and staff training in new technologies. She's even considering whether to outsource some of the company's application-development work—Feraudo's old bailiwick.

Despite his continuing interest in IS, Feraudo confesses that he's happier in a line position. "I'm not sure I want to go back. There are more career opportunities in a line position, and I think this is far more exciting." He acknowledges that he still has some work to do to come up to snuff (his weaknesses, say his boss and peers, are teamwork and "people skills"). But Feraudo has decided "this is definitely where I want to be." CIO

In the face of waning defense work, federal research labs are keeping busy beating their lasers into plowshares and helping the cause of U.S. competitiveness. Some private-sector manufacturing companies are taking full advantage, teaming up with the labs to tap scientific expertise on assorted space-age technologies.



PROFITING *from the* PEACE DIVIDEND

WITH THE DISSOLUTION OF THE SOVIET BLOC and the end of the arms race, the U.S. government is looking for ways to redirect the capabilities and personnel of the national research laboratories and other defense-related institutions. In a plan first advanced by the Bush administration, these resources are being positioned to provide scientific and technical expertise to private enterprise in order to bolster America's edge in the manufacturing sector—an edge that has slipped during the last decade.

BY DAVID H. FREEDMAN

PHOTO BY WEBB CHAPPELL

GREGORY J. YUREK *worried that lab scientists used to publishing and discussing their work would inadvertently let out information the company considered proprietary. So the government offered to place a two-year gag order on ASC-related research. Now such restrictions are commonplace.*

Partnerships between companies and government-run organizations are the vehicle for this conversion. In some cases, these involve outright subsidies to companies capable of making use of government-developed technologies on their own. The plan has been accelerated by the Clinton administration, which has already moved to drop the word "defense" from the Defense Advanced Research Projects Agency. The administration has proposed an initial investment of some $8 billion—plus a comparable amount in tax breaks—to push research and development at the 726 federally funded laboratories away from weapons and toward commercial endeavors.

Some of the partnerships envisioned are highly ambitious. For example, the American Textile Partnership (Amtex) is a coalition of the nine national laboratories run by the Department of Energy, large fiber producers like DuPont and tens of thousands of clothing manufacturers, distributors, wholesalers and retailers. Amtex is looking for ways to make the textile industry efficient enough to halt the loss of jobs to Third World competitors, where the cost of labor is low.

The so-called "Supercar" project is another large-scale undertaking. It is expected to throw as much as a half-billion dollars of government funds into a joint project with the Big Three automakers to produce an 80-mile-per-gallon car by 2003.

Perhaps the most visible of these partnerships is the National Information Infrastructure project—or the information superhighway—aimed at providing high-speed links among computers at companies, universities and government labs.

But most public/private-sector partnerships will be on a smaller scale. Typically, they will enable one or more companies in a particular industry to buy, at a subsidized price, the expertise of scientists and engineers at a national lab. In some cases, participating companies receive grants from the departments of Energy or Commerce to convert government-developed weapons or aerospace technology to commercial use. Beneficiaries range from giants like Intel Corp., which is working on future generations of computer chips, to a company designing a laser surgical tool that corrects nearsightedness by making a small incision in the cornea. And International Thermal Packaging, in Westlake Village, Calif., is borrowing from NASA a synthetic material that it is using in a self-chilling beverage can.

Perhaps the most visible of these partnerships is the National Information Infrastructure project—or the information superhighway—aimed at providing high-speed links among computers at companies, universities and government labs.

What can a private-sector company expect to gain out of these arrangements? How do the partnerships play out in practice—especially in light of the Clinton administration's goal to "reinvent" government? To find out, *CIO* looked at three examples.

American Superconductor Corp.

SCIENTISTS HAVE LONG KNOWN THAT MAterials chilled to below minus 454 degrees Fahrenheit acquire the extraordinary property of conducting electricity without losing any energy to heat. But it wasn't until 1986 that IBM scientists made the Nobel Prize-winning discovery that certain exotic materials acquire that same property at a relatively balmy minus 225 degrees Fahrenheit, warm enough for use in industrial applications. The problem was how to manufacture durable wire out of these brittle materials. American Superconductor Corp. (ASC) was founded a year later with that challenge in mind.

"Our goal was to aggressively move a brand-new technology from the research lab to the pilot manufacturing line and then into customers' hands in the shortest possible time," says ASC President and CEO Gregory J. Yurek.

Right from the start, ASC was a big believer in partnerships, striking deals with companies such as Italy's Pirelli Cable Corp. Pirelli could provide manufacturing and marketing expertise, along with resources tailored to the power-transmission industry, while ASC concentrated on developing better techniques for producing wire. So when the national labs began to send out feelers for partners around 1988, ASC jumped at the opportunity.

ASC also ended up striking deals with the Argon, Oak Ridge and Los Alamos National Laboratories. At each lab, ASC identified scientists it thought could provide the most-relevant expertise. It then set them loose on problems related to the organization's product development—such as how various superconducting materials could be made more malleable, less sensitive to magnetic fields or better able to carry large currents. No money changed hands in the deal. The labs continued to pay their own scientists, and ASC shouldered the costs of managing the programs and finding commercial applications for whatever came out of them.

"It's the company's job to bring the results to the factory and the marketplace."
–Gregory J. Yurek

Yurek says his biggest hesitation about joining forces with the labs was the fear that lab scientists—who are used to publishing their work in scientific journals and discussing it at conferences—would inadvertently let out information the company considered proprietary. The government sealed the deal, however, when it offered to place a two-year "clamp"—in effect, a gag order—on ASC-related research. (Now such agreements routinely include five-year clamps.) "We had always guarded our secrets jealously," says Yurek. "The agreement wouldn't have been possible without the clamp."

In fact, since government resources are available to all industry players deemed capable of commercializing new technologies, some of the national-lab scientists helping ASC work alongside scientists who are helping ASC's competitors. But lab scientists working for competitors are strictly prohibited from discussing their projects with one another, an arrangement with which Yurek insists he's comfortable. The government also reserves the right to use any breakthroughs for defense purposes and can even force ASC to license competitors to manufacture products crucial to defense if ASC lacks sufficient manufacturing capacity. "That's the kind of problem I'd like to have," says Yurek.

The Department of Energy formally rates the success of its national labs' partnerships, and those involving ASC have garnered top marks. ASC is so pleased with the results that it placed itself in the running for two

Your Tax Dollars At Work

How to make the most of a partnership

While companies that have teamed up with a government-run lab say they're glad they did, they also have learned there are ways to waste the experience. Here's some advice on making the partnership pay off:

Pick the project carefully. Managers of successful partnerships warn against signing up only for the sake of getting low-cost expertise. Know exactly what you want from the project and what separate strengths you and your partners bring to the table.

Educate partners about your applications. Just because national-lab employees may actually be rocket scientists, that doesn't mean they know much about your business. Sandia National Laboratory provided General Motors Corp. with a wealth of design ideas for devices that burn off unwanted chemicals from engine exhaust, but only after a little education. "They knew all there was to know about how these devices work in rocket engines, but we had to help them apply it to piston engines," says Richard Marczewski, GM's manager of technology leveraging.

Keep scientists focused on the task at hand. Research scientists unaccustomed to working for industry sometimes investigate whatever tangents appear interesting. "You have to work hand in glove . . . to make sure their goals are aligned with yours," says Gregory J. Yurek, president and CEO of American Superconductor Corp. "Otherwise, they'll end up following their noses."

Keep the project on schedule and on budget. Many national-lab scientists have worked on defense projects where time and money were no object. It can take some effort to get them to recognize that design excellence has to be weighed against practical constraints. Richard Polacek, research-and-development manager of Industrial Tools Inc., which developed a high-tech slicing machine with the help of Lawrence Livermore National Laboratory, says that scientists on the project said they "weren't used to getting something into production that quickly."

Protect proprietary information. Most standard government-lab partnership agreements prohibit the passing of trade secrets, but some companies may choose to take added precautions. American Superconductor, for example, immediately pulls work out of the national labs when it looks as if it will provide an important competitive edge.

Support the effort with information technology. E-mail and teleconferencing facilities can help partners remain in close touch. Project-management software can prevent time and cost overruns. A flexible personnel database can keep projects supplied with the right people at the right time. Customer databases can ensure that results will meet customer needs. An up-to-date parts database can reduce time wasted digging up engineering specs.

–D.H. Freedman

other superconductivity-related agreements, in which the government would provide $4.5 million to be divided between two teams of companies. One team would develop components to protect power grids from lightning strikes and other mishaps, and the other team would develop a high-efficiency electric motor. ASC ended up on both teams.

Despite the success Yurek claims for his company's government partnering, he notes that such agreements don't in themselves create profits. "The government only funds the early stages of a demonstration technology and not the commercialization process," he explains. "It's the company's job to bring the results to the factory and the marketplace."

Industrial Tools Inc.

ONE WAY TO GET MORE STORAGE CAPACIty on computer disk drives has been to shrink the size of the silicon read/write heads that float over the disk; some are now smaller than a grain of rice and 80/1,000ths of an inch thick. Still, an obstacle to achieving greater density was the inability to cut a slice of silicon any finer. Industrial Tools Inc. (ITI) of Ojai, Calif., was determined to respond to that challenge—before its competitors could.

The result is a slicing machine with an accuracy of 20 millionths of an inch, or 1/150 the width of a human hair. Richard Polacek, ITI research-and-development manager, says the company's partnership with Lawrence Livermore National Laboratory was critical to the rapid design and construction of the new machine. "With their help, and a lot of long days at this end, the machine was developed in seven months," he says. "That's about one-third the time [such a project] normally takes."

ITI realized in 1991 that it had an opportunity to jump ahead of its competitors if it could bring out an ultraprecise machine quickly enough. The company contacted Lawrence Livermore and ended up signing what turned out to be the first cooperative research-and-development agreement, or CRADA. The terms of a CRADA require that the industrial partner pay to the national lab at least half of the project's cost; in this case, ITI chipped in $250,000 at the start. "We've ended up spending a lot more than that," says Polacek, "but you can't put a price tag on the kind of expertise we got."

PHOTO BY ALAN LEVENSON

RICHARD POLACEK: *"We've ended up spending a lot more than [we expected], but you can't put a price tag on the kind of expertise we got."*

Lawrence Livermore engineers who specialize in analyzing structural rigidity went over proposed designs with high-powered supercomputer programs. These helped identify every possible means of adding stability (the machine's cuts needed to be so delicately calibrated that a person's breath might be enough to throw the machine off, as might a change in temperature of less than a degree). Traditional slicing machines use parts that slide across one another, but the lab engineers helped design bearings that move on a cushion of air, eliminating friction that could threaten the machine's stability.

Not only did the partnership yield a ground-breaking product, which ITI is now shipping, but the experience has changed the way the company looks at all projects. "The sort of esprit de corps we had with the lab and with our own people was something we'd never experienced before," says Polacek. "All of us in the company were affected by it."

General Motors Corp.

PARTNERING WITH THE GOVERNMENT IS nothing new to General Motors Corp.; the company has forged a wide range of agreements with Uncle Sam. These include Big Three coalitions to reduce emissions, individual agreements with national labs and formal CRADAs that provide a model for how such partnerships can be structured.

Working alongside Ford Motor Co. and Chrysler Corp. on many of these projects doesn't trouble the giant automaker in the least. "We don't compete on emissions control," says Richard Marczewski, GM manager of technology leveraging for North American operations. "We compete on style, handling and price. Why should we spend money in parallel when we can pool our resources, with each other and with the government, to address broader societal issues?"

One project that has been making progress is the Automotive Materials Partnership (AMP), the goal of which is to devise ways of reducing cars' weight, and thereby boost fuel-efficiency. Although weight and fuel-efficiency are less important in weapons building than in automobile design, the labs do have experience with state-of-the-art materials science. They are using this knowledge to help the automakers create lighter cast-iron components by making the interiors porous, to reduce the frictional wear on aluminum engine parts by applying high-tech coatings, and to harden parts by heating them with a laser that packs hundreds of times as much power as the biggest commercial lasers. "The lab may have developed the laser for the Star Wars program," says Marczewski, "but the laser doesn't care whether it's aimed at an incoming missile or a ball bearing."

GM is also working with the National Institute of Standards and Technology (NIST), which has been active in developing and promoting advanced manufacturing techniques. Federal funding for such projects grew from $15 million in 1991 to $200 million in 1993, and Congress is considering raising that to $1 billion.

In one joint project with NIST and the federally funded Idaho National Engineering Laboratory, for example, GM has learned to use sound waves to create a sonic X-ray of every axle component as it comes off the production line and detect units with internal flaws. Before, GM inspectors had to take one component out of every several dozen, cut it in half, polish it and then examine it under a microscope for flaws. If a unit was faulty, it and every unit made since the last inspection was discarded. "Can you imagine how wasteful that was?" asks Marczewski.

RICHARD MARCZEWSKI: *Partnering is not new to GM.*

Such breakthroughs are good not only for the automakers, says Marczewski, but potentially for hundreds of other U.S. industries that need to improve such basic processes as metalworking, injection molding and the durability of component parts. The scientists in the labs benefit, too, he says—and not only because the programs help reduce the need for budget and personnel cutbacks. "Now these people can come home and talk about what they did that day without requiring their spouses to have a security clearance."

David H. Freedman is a freelance writer and regular CIO contributor based in Brookline, Mass.

Finding Your Own Rocket Scientist

Companies looking, as the personal ads say, to form mutually satisfying relationships with expert government entities may need to shop around a bit for the right resource. However, getting started could be as easy as calling one of the following numbers:

- **The Federal Laboratory Consortium Locator,** at 800 775-7445
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Waves of the Future

Though they have yet to prove their mettle, a few newcomers to the technology scene hold considerable promise for business users

BY JOHN EDWARDS

Following the computer industry is like spending a day at the beach. Every few minutes, a wave crashes in and deposits something new at your feet. One may toss a pretty seashell your way. The next may bring in a rusty nail or an unsavory glob. On very rare and lucky occasions, a wave may actually present the visitor with a pearl-laden oyster or a lost treasure.

The computer revolution's innumerable waves have borne such bounty as PCs, client/server networks and laser printers. But they've also brought forth unsavory globs, like bubble memory, Apple Computer Inc.'s Lisa and IBM Corp.'s TopView.

The latest batch of technologies has just arrived on the shore. It's too soon to tell if this particular breaker has deposited anything of lasting value, but the nice thing about waves—whether aquatic or technological—is that there's always another one on the way.

Personal Digital Assistants

Call them personal digital assistants (PDAs), portable communicators or mobile assistants, these easy-to-carry handheld devices seem destined to make a big splash in business. The various models differ only slightly in design and concept; all merge pen input, handwriting recognition, personal-organization tools and state-of-the-art mobile communications into a compact, easy-to-use package.

Apple's Newton MessagePad is the best-known PDA, but similar units have been developed or are being planned by such companies as Compaq Computer Corp., Tandy Corp., Casio Inc. and AT&T's EO Inc. subsidiary. By late 1994, a dozen or more PDA models should be on dealers' shelves.

Although nearly all industry observers agree that PDAs are a good idea and will be with us in one shape or another in the years ahead, the jury is still very much out on whether the first ones are anything more than expensive novelties. Many early MessagePad users have complained about the unit's slow and inaccurate handwriting recognition, hard-to-read screen and limited storage capabilities. Users have also griped about the lack of decent PDA software, claiming that the few available applications are mostly warmed-over PC products that fail to fully exploit the PDA concept of fast, on-the-spot information.

PDA supporters are quick to point out that users' expectations are too high and that first-generation assistants like the MessagePad should be viewed as harbingers, works-in-progress of an important technology. The supporters draw comparisons between PDAs and early personal computers, most of which allowed users to do little more than balance a checkbook and play a few text-based games.

In any event, market researchers seem convinced that PDAs are here to stay. International Data Corp., of

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Framingham, Mass., says PDA shipments will grow to between 2 million and 5 million units by 1998, with sales topping $3.5 billion in five years. BIS Strategic Decisions, of Norwell, Mass., forecasts that the market will grow to 2.3 million units by 1998.

Wireless Communications

Wireless technologies are an important part of the budding PDA field. New-generation wireless systems are also making an impact on local area networking and person-to-person voice communications.

In the PDA arena, plug-in radio receivers currently allow users to receive brief onscreen messages transmitted via nationwide paging services. Next-generation radio modems will enable users to both receive and transmit text, video, sound and fax files. In the years ahead, PDA users will be able to dial up local area networks and an array of online information and transaction services from virtually any point on Earth. Ericsson GE Mobile Communications and Motorola Inc. are poised to become major players in the radio-modem field with units based on the PCMCIA standard for plug-in PC peripherals.

Several development projects are focusing on new ways of connecting users by radio. These ventures are grouped under the umbrella classification of personal communications services (PCS). PCS is based on a simple premise and a lofty promise: to give users data and voice connectivity anywhere, anytime.

Ventures and companies, including ARDIS Co., EMBARC (Electronic Mail Broadcast to a Roaming Computer), RAM Mobile Data Corp., McCaw Cellular Communications Inc., Pacific Telecom Inc. and SkyTel Corp., are looking for technologies that will make wireless communications fast, easy and cheap. Motorola's Iridium project is attracting particular interest; the venture aims to create a global wireless network using 66 satellites that would link up wireless users around the planet.

Another budding PCS technology is a communications infrastructure called the personal communications network (PCN). This system, based on microcell wireless technology, is designed to provide lower-cost wireless telephone coverage in metropolitan areas. The technology's cells, which are more-closely spaced than current cellular-telephone cells, will allow smaller and more-power-efficient radio transmitters. With PCN, many analysts see wireless PDAs and portable telephones eventually becoming as commonplace as wallets and pocketbooks.

Although nearly all industry observers agree that PDAs are a good idea, the jury is still very much out on whether the first ones are anything more than expensive novelties.

The PCS market got a shot in the arm last summer when the Federal Communications Commission approved the allocation of radio frequencies in the 1850MHz-to-1990MHz range to companies with PCS ventures. The channels will be auctioned to the highest bidders in a projected four-year process that's expected to place about $4 billion to $7 billion into the government's depleted coffers.

As with PDAs, market researchers see boom times ahead for wireless technologies. Market Intelligence Research Corp., of Mountain View, Calif., reports that wireless personal-communications products and services will balloon from $70 million in 1992 to $1.9 billion in 1996 and more than $13 billion by the end of the decade; New York-based Frost & Sullivan Inc. concurs.

Multimedia

Although multimedia is usually associated with home-oriented applications such as computer-based encyclopedias and learning programs, the technology also has a wide range of business applications. It is already making inroads in training, where products combining text, graphics, video and sound are helping users acquire and retain information and skills faster and more effectively. Well-designed multimedia applications combine audiovisuals drawn from videotape or laserdisc with computer intelligence to produce a learning experience that can quickly adapt to the needs of the user.

The most-conclusive study of multimedia training to date was conducted by the U.S. Department of Defense. The agency, which has an annual training budget of about $18 billion, found that the technology is generally more effective and less costly than conventional instruction. It also determined that multimedia could be used to teach students effectively in a variety of training environments.

For example, in manufacturing, multimedia can be called upon to help workers learn without risk about intricate and hazardous tasks. In all businesses, multimedia pop quizzes allow managers to assess a trainee's knowledge and steer instruction to most-needed areas. The technology is also useful in social-behavior training, as with programs that simulate sexual-harassment and minority-discrimination scenarios.

Compared with traditional classroom instruction, multimedia training can be cheaper, more convenient and less intimidating to employees. A product like the $4,995 Authorware Professional from Macromedia Inc., of San Francisco, allows nontechnical users to construct an icon-based interface that closely resembles a book, complete with multimedia "pages." The $3,395 Quest Multimedia Authoring System from Allen Communication Inc., of Salt Lake City, lets users create interactive multimedia courses featuring a wide range of visual and aural effects.

Multimedia is also making strong gains in other business areas. Marketing departments are installing multimedia-based kiosks that work as on-site demonstration and purchase centers, and management is discovering the benefits of multimedia-based presentations and business conferencing.

Even traditionally straitlaced business applications are getting into the multimedia act. For example, Lotus Development Corp., of Cambridge, Mass., is in the process of embedding multimedia capabilities into its core products. In March 1992, the company announced Multimedia SmartHelp for Lotus 1-2-3, a CD-ROM that offers sound, graphics and video learning capabilities. Another product, Lotus Sound, enables users to link and embed audio messages into business documents. Users can create and play back digitized audio files that can be attached to any Windows OLE-enabled application.

One barrier to more-widespread acceptance of multimedia in business is the technology's cost and evolving nature. Fully configured multimedia PCs are priced higher than plain PCs, while peripherals such as CD-ROM drives and add-in audio boards range from $300 to $800 each. Another key drawback is the fact that multimedia products add more weight to already-sagging and-overburdened networks.

Network throughput carries the greatest load when huge packets of full-motion video images and more-traditional data contend for limited bandwidth. A single frame of video requires 150Kbps of throughput. With full-motion video running at a rate of 30 frames per second, the strain on a network can be enormous. To run multimedia without compromise requires added disk storage, more-muscular processors, faster networks and advanced software, most of which remain unavailable and cost-prohibitive. Even when higher-bandwidth and increased-storage multimedia building blocks arrive, these extras will still be necessary.

Still, expectations for multimedia technology are running high. According to Market Intelligence, multimedia sales worldwide will almost quintuple over the next five years, going from $5 billion in 1993 to $24 billion by 1998.

Virtual Reality

Anyone who has watched TV or picked up a newsmagazine in the past few months knows something about virtual reality. Unfortunately, since most media reports have concentrated on the technology's "gee whiz" aspects, all most people know about it is that you must put on a funny helmet and ride up and down various computer-generated escalators.

But virtual reality actually has a broad array of practical business applications. Major airlines and the military have used aircraft simulators for decades—a type of virtual reality that combines computer-generated effects with real-world equipment and surroundings. The big advantage offered by the emerging generation of fully digitized virtual-reality systems is lower cost, which will eventually make the technology available to many more businesses.

Some of the potential applications are genuinely mind-boggling. For investment managers, virtual reality could be used to quickly uncover undervalued stocks. In one possible system, the user would wander through a field of 3-D blocks, with blue blocks representing rising stocks and red ones denoting falling issues. The view would allow the investor to instantly see how individual stocks are doing in comparison with their competitors—an edge that could mean quick profits in fast-paced financial markets.

Training products combining text, graphics, video and sound are helping users acquire and retain information and skills faster and more effectively.

Real-estate agents and conference planners could use the technology to scout properties "on-site" without leaving their offices. For companies that deal with hazardous substances and technologies, it could be used to train workers in a danger-free setting (just as the airlines and nuclear-power industries currently do with their high-cost simulators).

For most businesses, practical applications lie at least several years away. But a number of software publishers are now offering virtual-reality toolkits and simulators that can help businesses become acquainted with the technology.

Sausalito, Calif., vendor Autodesk Inc. recently released the Cyberspace Developer Kit—a sophisticated toolkit for writing virtual-reality programs. The company predicts that the kit's programming capabilities and relatively low $2,495 price tag will accelerate the use of virtual-reality applications across industry lines. Applications are currently being developed by the software's users in the business, science, education and entertainment markets. The programs themselves offer "worlds" that users enter using anything from simple keystroke commands to full glove-and-helmet interaction. The kit provides built-in networking capabilities and runs on any 386-based PC or higher.

Businesses looking for a bargain-basement taste of virtual reality can check out Virtus VR, published by Virtus Corp., of Cary, N.C. The $99 package allows users to explore, alter and invent realistic 3-D worlds on their PC screens. Virtus VR comes with five prefabricated worlds: the White House (including the Oval Office), the Hindenburg zeppelin, a "mystery house," a futuristic ocean-floor research/apartment complex and Dallas's Dealey Plaza, site of the Kennedy assassination.

The latter world features President and Mrs. Kennedy in their limousine riding by the infamous grassy knoll before a scanned image of the Texas School Book Depository. Users can conduct their own investigations of the assassination by viewing the knoll from the perspective of the limo or by "flying up" to the Depository and peeking through the fateful window.

Pretty strong stuff. But if reliving national tragedies isn't your thing, you can always enter the software's ocean-floor world and watch the waves pass overhead. You may even spot a new technology. CIO

John Edwards is a freelance writer based in Mt. Laurel, N.J.

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Made for Export

When paperwork threatened to overwhelm Raytheon's export staff, it was clear the old manual processing system couldn't survive. Thanks to some export-management software, things are sailing smoothly again.

If your company has spent months or even years engineering and producing a product and you're finally sending it off to a customer, the last thing you want is for it to be held up in customs because of a transposed number on an export document. Yet that can happen, because in the export business, paperwork paves the product pipeline.

"Documents move freight in this business," says John Caligiure, manager of export at Raytheon Co. in Lexington, Mass. "If you can't clear the documents, customers can't get their goods. [And if the documents] aren't 100 percent correct, there's a chance of being delayed and possibly no payment, or even confiscation. You must dot the i's and cross the t's."

Until recently, most exporters—including Raytheon—relied on manual methods to process the documents for their relatively modest export volumes. During the 1980s, however, U.S. exports more than doubled, going from $216 billion in 1982 to $448 billion in 1992, according to the International Trade Administration, a division of the U.S. Department of Commerce. Since exporting even a simple shipment requires six or seven documents, the paperwork soon became unmanageable, spurring demand for export-specific software to increase the speed and accuracy of the process.

Raytheon, which produces electronics products such as marine radio telephones, radar and semiconductors as well as the Patriot Missile, knew the problem well. "We'd keep hiring people to handle the paperwork," explains Caligiure. "We were up to 24 people, and we still couldn't keep up. We were always behind." The company ships to about 3,000 customers outside the United States; by 1992, exports reached 18.7 percent of its net sales.

At the end of 1988, Raytheon responded to the mounting problem by implementing export-management software that let management immediately redeploy six people—25 percent of the export staff—to other areas of the company. The new system, Syntra Ltd.'s EX-TRA, automates the creation of all documents involved in export, from order acknowledgments to invoices and shipping documents. It includes several databases containing standard information; a product database, for instance, contains product codes, descriptions and licensing requirements.

Processing the paperwork for an order previously required one to two days, depending on its complexity; it now takes half an hour. "You just type in basic information, and the computer automatically fills in the documents you need," explains Patty Peterson, export technical specialist. "It eliminates all the manual data entry of creating the guts of the documents."

In the past, if an order required 10 documents, for example, an employee would have to enter all the basic information (such as name and address) 10 times. Now, once a customer file exists, the data is downloaded automatically. Employees also had to enter and calculate numbers such as prices, which could easily result in errors and transposed numbers. Now many are simply downloaded, and calculations are performed automatically.

Other key aspects of the system include producing internal and external reports and faxing documents directly from the computer to a customer.

In October 1992, Raytheon implemented an upgrade of the software and installed it on an IBM RS/6000 rather than the 386-based PC the first version ran on. The upgrade incorporates new flexibility and lets employees process orders faster, increasing productivity by almost 11 percent over the previous version. Compared with the manual system, the upgrade has increased productivity by 45 percent.

"Customers are much happier with our service," says Peterson. "When they want a product, we can turn around a shipment that day. Before, it wasn't always possible to do that.

"We used to be in a sea of paperwork," she adds. "Now we're much more streamlined and efficient."

–Nancy Hitchcock

VITAL STATISTICS

Organization: *Raytheon Co., Lexington, Mass.*

Application: *Export-management system*

Sponsor: *John Caligiure, manager of export*

Technologies: *Syntra Ltd.'s EX-TRA export-management software; IBM RS/6000*

Scope: *Staff involved in producing export documents*

Objective: *To reduce the amount of paperwork and increase accuracy*

Payoff: *Reduced export staff by 25 percent; increased productivity by 45 percent; reduced order-processing time from one or two days to half an hour*

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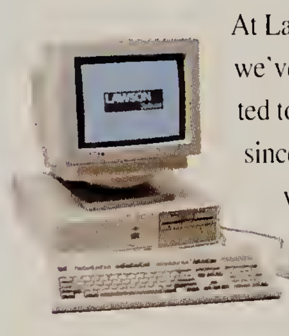
HOW TO UNRAVEL THE CLIENT/SERVER MYSTIQUE.

First, accept that there is no mystique. Rather, there are hordes of slightly frantic software companies content to have you believe that effective open system solutions remain elusive while they rush to understand, develop, and market their interpretation of client/server. Then there's Lawson Software.

An Open Systems Foundation



At Lawson Software, we've been committed to open systems since our company was founded in 1975. We've always believed that to be a valuable business partner, an applications provider must offer choices for business strategy development. So for us, client/server isn't a new phenomenon. Instead, it's the next logical step in our development. And it exists today – fully developed and fully functional – in the latest release of our enterprise-wide, cross-industry, world-class business application software.

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The truth is, client/server takes on a special meaning for each individual business computing environment. That's why we've structured our client/server solution as a comprehensive 3-tier architecture, delivering you maximum flexibility in hardware, database and user interface. It's why Lawson's products run across platforms like the AS/400 as well as UNIX systems such as the RS/6000 and HP9000. And it's also why we feature seamless support for a variety of leading databases. In short, we offer options that allow you to make the decisions. Based on your existing hardware configurations and your plans for future development, you choose to place the components of client/server where they will deliver the greatest value and performance.

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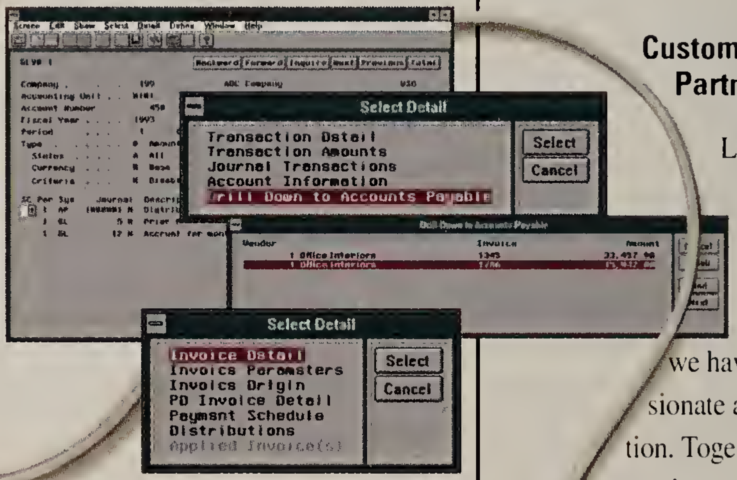

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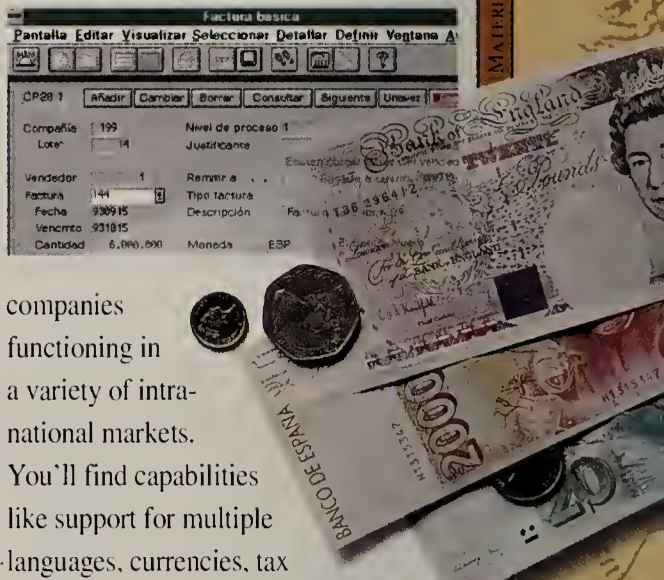

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